Vol. 19. No. 10. pp. 529-590
Abstracts 2351-2621

October, 1949

THE VETERINARY BULLETIN

1949

COMMONWEALTH BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

31 JAN. 1950

Price 5/- net

Annual Subscription £2

Commonwealth Agricultural Bureaux.

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COMMONWEALTH BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 19.] October, 1949. [No. 10.

DISEASES CAUSED BY BACTERIA AND FUNGI

GALE, E. F. (1948.) **The nitrogen metabolism of Gram-positive bacteria. (The Herter lectures for 1948.) Lecture I. The assimilation of amino-acids. Lecture II. The intracellular utilization of glutamic acid and its inhibition by certain antibacterial agents. Lecture III. The nature of penicillin sensitivity in** *Staphylococcus aureus*.—*Johns Hopk. Hosp. Bull.* **83.** 119–134; 134–153; 154–175. [Abst. in *Bull. Hyg., Lond.* **23.** 998–999. (1948), copied *verbatim.* Signed: R. E. O. WILLIAMS.] **2351**

In these three Herter Lectures, Gale reviews recent investigations by himself and others on the assimilation and utilization of amino-acids by Gram-positive cocci, principally *Staph. aureus* and *Str. faecalis*. Gram-positive organisms are distinguished from Gram-negative organisms by their ability to concentrate certain amino-acids, such as glutamic acid and lysine, in their internal environment. The assimilation of glutamic acid is an active phenomenon since it does not occur unless the cells are provided with glucose or some other energy source; lysine on the other hand apparently enters the cells by a process of diffusion. The concentration gradient is probably maintained by a lipoid-containing cell wall, which can be dissolved away from the cell by certain detergents.

Treatment of *Str. faecalis* cells with crystal violet or similar dyes results in a marked increase in the internal concentration of glutamic acid, although the assimilation process is apparently unaltered. The increase apparently results from inhibition of the metabolic use of glutamic acid within the cell, and there are some indications that the enzyme that is affected carries out phosphorylation of the glutamic acid. Glutamic acid also appears to undergo a second form of metabolism within the cell, namely condensation to protein, and this second form is inhibited by sulphonamides. Resistance to sulphonamide-inhibition is correlated to some extent with the level of the glutamic acid in the young cells.

Addition of penicillin to a growing culture of *Staph. aureus* that is actively assimilating glutamic acid results, after a lag period of about one hour, in cessation of assimilation; and this occurs before respiratory failure or lysis has commenced, and before the glutamic acid metabolism inside the cells has ceased.

Increase in penicillin resistance is associated with a decrease in assimilation affinity for glutamic acid. A strain of *Staph. aureus* "trained" to resist 6,000 units per ml. became transformed to a Gram-negative pleomorphic bacillus and in this state failed to concentrate glutamic acid in the internal environment and was apparently able to synthesize all its amino-acid requirements. Penicillin does not affect the assimilation of lysine. It is possible that penicillin in some way interferes with the synthesis of the Gram-complex and thus interferes with assimilation and internal concentration of glutamic acid, and examination of cells treated with penicillin does suggest that there is some breakdown in ribonucleic acid metabolism.

BÖE, J., & VOGELSANG, T. M. (1949.) **Penicillin-resistant pathogenic staphylococci isolated from the upper respiratory tract.**—*Acta path. microbiol. scand.* **26.** 71–76. [In English, authors' summary copied *verbatim.*] **2352**

Investigations of penicillin-sensitivity of strains of staphylococci isolated from the nose and throat have shown that there are many resistant strains. In 18·8 per cent. of 287 strains, marked resistance (over 5·71 u/ml.), and in 8·7 per cent. (between 0·17 and 5·71 u/ml.) relative resistance was found. In more than half the cases examined, the strains of staphylococci isolated from the throats of patients treated with penicillin were found to be penicillin-resistant.

The epidemiological significance of the occurrence of penicillin-resistant staphylococci in the upper respiratory tract is not perfectly plain, but we may presume that this state of affairs will contribute much to an increase in the frequency of primarily resistant strains.

ERIKSEN, K. R. (1949.) **Studies on the mode of origin of penicillin-resistant staphylococci.**—

Acta path. microbiol. scand. **26.** 269–279. [In English, author's summary copied *verbatim.*] 2353

The appearance of penicillin-resistant strains of Staphylococcus aureus under cultivation on penicillin-containing medium is investigated by employment of solid as well as fluid media.

The resistant bacteria obtained with the two different methods appear to be of quite the same character.

Secondary growth of resistant bacteria is observed only in penicillin concentrations where a primary growth takes place. On this account, then, it has to be assumed that the appearance of penicillin resistance is dependent on such growth.

The experiments also appear to show that penicillin-resistant bacteria arise only after contact with penicillin for some length of time—in contrast to the prevailing theory about spontaneous mutation.

The variation observed by Demerec in the number of resistant colonies in subcultures on penicillin agar from independent cultures could be seen only on employment of very small cultures, whereas the number of resistant colonies was constant when cultures of 15 cc. were used for this purpose. So the findings reported by Demerec cannot be taken to prove that the resistance to penicillin arises through spontaneous mutations.

KLIMEK, J. W., CAVALLITO, C. J., & BAILEY, J. H. (1948.) **Induced resistance of *Staphylococcus aureus* to various antibiotics.**—*J. Bact.* **55.** 139–145. [Authors' summary copied *verbatim.*] 2354

Staphylococcus aureus 209P (ATCC 6538P) can develop marked resistance to penicillin, streptomycin, and the active principle "A" of *Asarum canadense.* This organism developed an intermediate degree of resistance to both pyocyanin and gliotoxin, whereas very little resistance was developed to allyl-2-propene-1-thiosulfinate, mercuric chloride, or to the active principle of *Arctium minus.* This organism failed, under the conditions of these experiments, to develop resistance to aspergillic acid.

S. aureus has been rendered resistant to a concentration of penicillin of 4 mg per ml. At a concentration of 1 mg per ml the characteristic biochemical reactions of *S. aureus* were lost, and the organism became markedly pleomorphic and gram-negative. The resistance of the strain was apparently stabilized by repeated transfers in broth containing 4 mg per ml of penicillin.

The biochemical, tinctorial, and morphological characteristics of the parent culture were regained when the strain that was resistant to 1 mg per ml of penicillin was cultured in penicillin-free medium.

During 12 transfers in increasing concentrations of streptomycin, *S. aureus* developed a resistance to 4 mg per ml of that antibiotic.

All of the characteristic biochemical reactions of the organism were suppressed at this level of resistance, but no noticeable change in morphology was observed.

At high levels of resistance to penicillin and streptomycin slight cross resistance to these antibiotics could be demonstrated.

BAILEY, J. H., & CAVALLITO, C. J. (1948.) **The reversal of antibiotic action.**—*J. Bact.* **55.** 175–182. [Authors' summary copied *verbatim.*] 2355

Bacteriostasis by mercuric chloride, allyl 2-propene-1-thiosulfinate, and gliotoxin can be reversed by the addition of cysteine to the bacteriostatic system. Bacteriostasis caused by penicillin, streptomycin, the active principle of *Asarum canadense*, or pyocyanin was not reversed by cysteine. In addition to cysteine, glycylcysteine, N-acetyl-cysteine, and sodium thioglycolate were effective reversing compounds for mercuric chloride; the thiosulfinate was reversed by all except sodium thioglycolate, whereas only N-acetyl-cysteine had any effect on the gliotoxin bacteriostasis. Thiol-reactive antibiotics may be classified on the basis of thiol reversibility of the bacteriostasis produced.

WALKER, B. S., DEROW, M. A., & SCHAFFER, N. K. (1948.) **The partial purification of staphylocoagulase and the effect of certain presumptive inhibitors upon its plasma-coagulating action.**—*J. Bact.* **56.** 191–199. [Authors' summary copied *verbatim.*] 2356

The growth of *Lactobacillus casei* could be completely prevented by the addition of low concentrations of lysolecithin to a medium which was complete except that it contained biotin in suboptimal amounts. With biotin concentrations up to 1 mμg per tube, the amount of lysolecithin required to give complete inhibition varied directly with the concentration of biotin. If oleic acid or a fat-soluble biotin-active material from plasma was used in place of biotin, lysolecithin at concentrations up to ten times those found inhibitory with biotin had only a small growth-stimulating effect. In a medium containing excess biotin but suboptimal concentrations of pantothenic acid, growth of the organism was inhibited by appropriate concentrations of lysolecithin. Here again, if the biotin was replaced by an adequate concentration of oleic acid or the fat-soluble material from plasma, lysolecithin had a slight stimulatory effect rather than an inhibitory one.

BEKKER, J. H. (1947.) **Studies on staphylococci. II. Antistaphylocoagulase in human**

serum.—*Antonie van Leeuwenhoek ned. Tijdschr. Hyg. Microbiol.* **13.** 128–134. [Abst. in *Bull. Hyg., Lond.* **23.** 547. (1948), copied *verbatim* Signed : R.E.O. WILLIAMS.] **2357**

Of 100 sera sent for Wassermann tests, 37 inhibited the action of a filtered preparation of coagulase in dilutions of 1 : 64 or more, and 58 in dilutions between 1 : 2 and 1 : 32 ; only 5 failed to inhibit the coagulase. The coagulase-inhibitor withstood a temperature of 65°C. for 30 minutes, but was destroyed at 70°C. in 30 minutes. Fractionation with ammonium sulphate and ethyl alcohol, and electrophoretic isolation, suggested that the anticoagulase was associated with the α- or β-globulin rather than the γ-globulin. No evidence was obtained to show that the coagulase-inhibitor is a true antibody.

GRUNBERG, E., UNGER, C., & ELDRIDGE, D. (1948.) **The sensitivity of streptococci to penicillin G after exposure to the antibiotic *in vivo*.**—*Yale J. Biol. Med.* **21.** 121–126. [Authors' summary copied *verbatim*.] **2358**

The sensitivity of streptococci after their exposure to penicillin in vivo was determined by Fleming's technic of the gutter plate. The streptococci recovered from the tissue of infected and treated mice showed a significantly increased sensitivity towards the minute amounts of penicillin that diffused into the medium as compared with streptococci isolated from the tissues of untreated controls.

The increased sensitivity could be demonstrated as well by the extended zones of inhibition produced on the gutter plate as by the considerably reduced number of colonies recovered from the treated animals.

By the use of penicillinase plates the existence of states of reversible and irreversible damage was confirmed as well as the fact that this " critical " change in the viability of the organisms occurred after 4 to 6 hours. The increase of sensitivity could be demonstrated in both stages.

MONLUX, A. W. (1948.) **The catalase test in the diagnosis of infectious bovine mastitis.**—*Cornell Vet.* **38.** 389–404. [Author's summary and conclusions copied *verbatim*.] **2359**

When the modified Lind apparatus and procedure were used in conducting the catalase test in this investigation, 15 ml. of milk were tested in a 20-ml. capacity tube by adding 5 ml. of 3 per cent hydrogen peroxide and determining the volume of free oxygen that was liberated from the mixture after incubation at 24–37°C. for six hours. A criterion of 2 ml. of free oxygen is established as the positive test to indicate cows that should be suspected of being afflicted with infectious mastitis. Negative catalase tests often have catalase values of less than 1 ml. of free oxygen and cell counts below 100,000 per ml. Increased quantities of catalase in the milk and positive catalase tests may be associated with early lactation for approximately the first four weeks following parturition, and with low production during any stage of the lactation period. Non-infectious mastitis is also responsible for the appearance of variable quantities of catalase in milk.

Catalase is active over a wide temperature range, but its optimum is 0–10°C. Since it is not feasible to conduct catalase tests at these temperatures, activity at higher temperatures is significant. At temperatures of 25°C. and 37°C., there is no appreciable difference in the volume of gas formed by duplicate samples. Bacteria are not present in sufficient numbers in a milk sample until several hours from the time of collection to influence oxygen formation in the catalase test significantly. If samples are refrigerated, accurate values can be obtained when the test is conducted three to four days after the date of collection. Although a definite diagnosis of infectious mastitis can only be made by cultural methods, the catalase test is a valuable diagnostic aid.

DUTHIE, E. S. (1947.) **The production of stable potent preparations of penicillinase.**—*J. gen. Microbiol.* **1.** 370–377. [Author's summary copied *verbatim*.] **2360**

Optimal yields of penicillinase were obtained by the continuous addition of penicillin to cultures of certain strains of *Bacillus subtilis* during their logarithmic growth phase.

Lower yields of enzyme were obtained if the penicillin was added when growth had ceased or to partly grown cultures kept at rest and subsequently shaken.

Partial lysis of the bacteria was accompanied by an increased yield of enzyme, but complete lysis appeared to result in partial destruction.

WEINSTEIN, L., & OLIVER, C. S. (1948.) **The treatment of human anthrax with penicillin.**—*Amer. Practitioner.* **2.** 533. [Abst. in *Bull. Hyg., Lond.* **23.** 955. (1948), slightly amended.] **2361**

Weinstein and Oliver report three cases of cutaneous anthrax in men who worked at occupations where they came in contact with hides or wool. One sustained a scratch while unloading Argentinian hides, and the other two worked in carpet and rug factories where they had contact with wool. In one instance the lesion was on the face ; in another on the neck, and in the third there were two malignant pustules on the right forearm. Bacteremia occurred in the person who had the two lesions ; he was also found to have *Bacillus anthracis* in the spinal fluid during an

acute episode of disorientation. All three patients were given penicillin intramuscularly and all made a complete recovery. The response to treatment with penicillin appeared to be more rapid than that attributed to the sulfonamide compounds, antiserum, or when these agents were used alone or in various combinations. Since the mortality rate of cutaneous anthrax is only about 16 to 22 per cent., it is difficult to evaluate the importance of penicillin, in saving the lives of the three patients. Because of lack of toxicity as compared with the sulfonamide compounds, antiserum and neoarsphenamine and the rapidity with which clinical improvement takes place, penicillin appears to be the agent of choice in the treatment of cutaneous anthrax.

GREGORY, T. S. (1949.) **Studies on bovine tuberculosis in the Australian environment. I. Tuberculins and their usage intradermally.**—*Aust. vet. J.* **25.** 17–26. **2362**

G. gives a detailed account of the development of tuberculins used intradermally with particular reference to specificity and the elimination of non-specific reactors to the test, potency and the increase in accuracy in detecting affected animals. —D. C. BLOOD.

KÜST. (1949.) Paarungstuberkulose bei Rindern. [**Genital tuberculosis in cattle.**]—*Tierärztl. Umsch.* **4.** 74–75. **2363**

The lesions of primary TB. of the genital organs of cows and bulls, transmitted by coitus, are described.—E. G.

SLOAN, R. A. (1942.) **The dissemination of tubercle bacilli from fresh autopsy material.**—*N.Y. St. J. Med.* **42.** 133–134. [Abst. in *Bull. Hyg., Lond.* **23.** 94. (1948), copied *verbatim.*] Signed: CHARLES WILCOCKS.] **2364**

The author, having in mind the possibility that living tubercle bacilli may be scattered into the air during manipulation of tuberculous lungs at autopsy, devised a technique whereby a glass plate was exposed 8 inches from the surface of tuberculous lungs cut with scissors in the usual way, and tested for crepitation by compression. The plates were then washed, and the washings centrifuged and examined microscopically and by culture. In 8 of 10 experiments, cultures of tubercle bacilli were obtained after periods varying from 12 to 51 days. Direct microscopic examination was positive in these 8 experiments when fluorescence microscopy was used, but only in 3 with Ziehl-Neelsen technique. [No animal inoculation tests of these organisms are recorded.]

The author concludes that the usual methods of post-mortem examination of tuberculous lungs may contaminate the air, and that precautions should be taken to protect students and others assisting at such examinations. Even lungs with only minimal lesions were found to contaminate the glass plate.

NAGAKI, D., HAGA, T., & YAJIMA, T. (1948.) **Studies on the antituberculosis antibodies obtained from a spore-bearer. Report I. On the antibiotic produced by a sporulating bacillus against mycobacterium tuberculosis avium. Report II. Action of the antibiotic substance obtained from a spore-bearer against the human tubercle bacilli.**—*Kitasato Arch. exp. Med.* **21.** 26–27; 28–30. [Abst. in *Bull. Hyg., Lond.* **24.** 86. (1949), copied *verbatim.* Signed: CHARLES WILCOCKS.] **2365**

I. The spore-bearing organism was isolated from air. It is known as the A-3 strain [the genus is not given], and is motile, Gram-positive and indole-negative. The antibiotic substance it produces is active against Gram-positive organisms; it is precipitated by acidification of the culture fluid to *p*H 3, and after purification is seen to be a brown powder, soluble in organic solvents. It is both bacteriostatic and bactericidal, in different concentrations, against a strain of avian tubercle bacillus.

II. With a strain of human tubercle bacillus this substance inhibited growth in fluid medium at dilutions of 10^{-2} to 10^{-4}. [A very few details are given of laboratory experiments performed.]

STEENKEN, W., Jr., & WOLINSKY, E. (1948.) **Streptomycin in experimental tuberculosis. II. Response to guinea pigs infected with strains of varying degrees of streptomycin resistance.** —*Amer. Rev. Tuberc.* **58.** 353–362. [English and Spanish summaries, English summary copied *verbatim.*] **2366**

Guinea pigs infected with two highly streptomycin-resistant strains of human tubercle bacilli were not benefited by streptomycin therapy.

Under the specific conditions of the reported experiments, the streptomycin-treated guinea pigs infected with these two cultures began to succumb sooner than the untreated animals.

Comparisons between *in vitro* streptomycin sensitivity of cultures of tubercle bacilli isolated from patients, with *in vivo* streptomycin sensitivity in guinea pigs, reveals good agreement for cultures sensitive to 2·5 or less mcm. per cc., and for those resistant to 15 or more. [mcm. = microgram,]

Some cultures of borderline resistance (sensitive to 5 to 15 mcm. per cc.) responded well *in vivo*, others responded poorly.

Strains of tubercle bacilli recovered from the streptomycin-treated and from the control animals infected with these cultures of intermediate resistance exhibited essentially the same drug sensitivities as the original infecting cultures.

The results of streptomycin therapy in five groups of guinea pigs infected with artificial mixtures containing various proportions of sensitive and resistant H37 Rv microörganisms, indicate that the response to treatment improves as the percentage of resistant organisms decreases below 10 per cent.

CORPER, H. J., & COHN, M. L. (1949.) **The probable mechanism of streptomycin action in tuberculosis.**—*Yale J. Biol. Med.* **21.** 181–200. [Authors' summary and conclusions copied *verbatim.*] **2367**

Streptomycin in vitro in amounts up to 1000 units per cc. possesses no tuberculocidal action within one month of contact at 37°C.

Streptomycin is not adsorbed or absorbed in active form by mammalian tubercle bacilli, nor by egg-white or egg-yolk in which it is not destroyed by heat coagulation of these materials.

Streptomycin in vitro appears to act only during its presence in nutrient mediums, which does not explain the sustained retardant action in vivo on tuberculosis.

Streptomycin exerts no appreciable discernible effect upon the viability of virulent human tubercle bacilli in vivo.

Streptomycin retards skin tuberculosis produced by the intracutaneous injection of virulent human tubercle bacilli as well as that produced by avirulent human tubercle bacilli.

Streptomycin treatment, although not a complete retardant either to tubercle bacilli in vitro or to tuberculosis in vivo, exerts a definite effect upon the splenomegaly produced by virulent or avirulent human tubercle bacilli.

Streptomycin treatment does not appear to be able to prevent the natural development of specific tuberculo-immunity, specific tuberculo-allergy, or bacillary allergic intoxication.

Streptomycin action on tuberculosis does not appear to be interfered with by loading the reticulo-endothelial system with India ink or avirulent tubercle bacilli.

In retarding tuberculosis, streptomycin does not appear to prevent a lethal effect from the intravenous infection with virulent human tubercle bacilli, in spite of the fact that not enough evident macroscopic tuberculosis is present at the time to account for death. The streptomycin resistance of the tubercle bacilli may play a part in this phenomenon.

From the evidence at present available there is a likelihood that streptomycin does not act on tubercle bacilli per se in vivo as retardant to their growth as it does in vitro by direct contact, but that some intermediate mechanism accounts for its action on tuberculosis and consequently on tubercle formation.

BERNSTEIN, S., D'ESOPO, N. D., & STEENKEN, W., Jr. (1948.) **Streptomycin resistant tubercle bacilli. Incidence in patients treated with streptomycin.**—*Amer. Rev. Tuberc.* **58.** 344–352. [English and Spanish summaries, English summary copied *verbatim.*] **2368**

Forty-five patients with pulmonary tuberculosis were treated with 1·0 gram of streptomycin daily, divided in five or six equal doses, for a period of one hundred and twenty days. Tubercle bacilli isolated prior to therapy from all 45 patients were sensitive to 1·0 mcm. or less of streptomycin per ml. of medium. After one hundred and twenty days of streptomycin treatment, tubercle bacilli were recovered from the sputum or gastric contents of 31 of the 45 patients (69 per cent). Tubercle bacilli resistant to 10 or more mcm. of streptomycin per ml. were recovered from 26 of the 31 patients (84 per cent). Eighteen strains were capable of growth in over 1,000 mcm. of streptomycin per ml. of media. The rate of development of streptomycin resistant tubercle bacilli was greatest during the second month of therapy. [mcm. = microgram.]

WOLINSKY, E., REGINSTER, A., & STEENKEN, W., Jr. (1948.) **Drug-resistant tubercle bacilli in patients under treatment with streptomycin.**—*Amer. Rev. Tuberc.* **58.** 335–343; [English and Spanish summaries, English summary copied *verbatim.*] **2369**

Cultures of tubercle bacilli recently isolated from 47 patients before treatment with streptomycin were uniformly sensitive to 1·0 mcm. per cc. or less of the drug. Tubercle bacilli resistant to the action of 10 mcm. of streptomycin per cc. or more were found commonly in patients under streptomycin therapy. A drug-resistant culture was isolated as early as twenty-nine days after therapy was begun. The longer treatment was continued, the greater the percentage of patients yielding drug-resistant cultures. Out of a total of 47 patients studied intensively, the percentage of those yielding positive cultures whose organisms were resistant to streptomycin was: 4·5 per cent after four weeks of therapy, 12·5 per cent after six weeks, 23 per cent after eight weeks, and 37 per cent after twelve weeks.

An estimate of the relative number of drug-resistant organisms in a culture may be made by noting the lag period before growth appears in the tubes containing streptomycin. The duration of the lag period is inversely proportional to the percentage of resistant organisms.

In general, streptomycin resistance is a relatively long-lasting characteristic of tubercle bacilli, both *in vitro* and *in vivo*. The serial cultures from two patients, however, reverted from drug-resistant to drug-sensitive.

EDISON, A. O., FROST, B. M., GRAESSLE, O. E., HAWKINS, J. E., Jr., KUNA, S., MUSHETT, C. W., SILBER, R. H., & SOLOTOROVSKY, M. (1948.) **An experimental evaluation of dihydrostreptomycin.**—*Amer. Rev. Tuberc.* **58.** 487–493. [English and Spanish summaries, English summary copied *verbatim.*] **2370**

Dihydrostreptomycin and streptomycin were closely comparable in anti-bacterial activity on a weight for weight basis against *M. tuberculosis* of human (H37Rv) and avian types *in vitro* and against the avian type in chicks. No substantial differences in antibacterial activity of the two drugs were found against a variety of other pathogenic micro-organisms *in vitro* and *in vivo*. Micro-organisms resistant to streptomycin are also resistant to dihydrostreptomycin. The chronic neurotoxicity of dihydrostreptomycin in cats is less than that of streptomycin. When the two drugs are given to cats in doses containing equal weights of base, ataxia and loss of nystagmus appear later and are less severe with dihydrostreptomycin than with streptomycin.

Biochemical, hematological, and pathological studies revealed no significant evidence of other toxicity in dogs or monkeys treated with dihydrostreptomycin.

FELDMAN, W. H., KARLSON, A. G., & HINSHAW, H. C. (1948.) **Dihydrostreptomycin: its effect on experimental tuberculosis.**—*Amer. Rev. Tuberc.* **58.** 494–500. [English and Spanish summaries, English summary copied *verbatim.*] **2371**

A study was done to determine the antituberculosis efficacy of dihydrostreptomycin. A group of guinea pigs was inoculated subcutaneously, each animal receiving 0·001 mg. of streptomycin-sensitive human strain tubercle bacilli, H37Rv. Beginning forty-two days later, one group of 17 animals was treated with 6·0 mg. of dihydrostreptomycin daily and one group of 9 animals received 6·0 mg. of streptomycin subcutaneously daily. The remaining 20 animals served as controls. The experiment continued for a total of 161 days after the animals had received the infective dose of tubercle bacilli. The period of treatment was 119 days. The results of this phase of the study indicated definitely that the antituberculosis potency of dihydrostreptomycin was equal to that of streptomycin.

In another study the effectiveness of dihydrostreptomycin against experimental tuberculosis induced by a human strain of tubercle bacilli resistant to more than 1,000 micrograms of streptomycin per milliliter of medium was determined. In this study dihydrostreptomycin failed to produce any recognizable therapeutic effect.

HINSHAW, H. C., FELDMAN, W. H., CARR, D. T., & BROWN, H. A. (1948.) **The clinical administration of dihydrostreptomycin in tuberculosis. A preliminary report.**—*Amer. Rev. Tuberc.* **58.** 525–530. [English and Spanish summaries, English summary copied *verbatim.*] **2372**

Sufficient evidence has been accumulated to indicate that dihydrostreptomycin is an effective drug for the treatment of some types of clinical tuberculosis. Its activity is probably similar to that of streptomycin but it is clearly much less toxic than streptomycin when given in comparable doses for similar periods. Most significant is the fact that dihydrostreptomycin may be administered to patients in doses of 2·0 to 3·0 gm. per day for sixty days, or perhaps longer, with little danger of producing impairment of function of the organs of equilibration.

The fact that dihydrostreptomycin may be administered to some patients who are markedly allergic to streptomycin and the fact that eosinophilia has not been observed in this series of treated patients may be important.

The only unfavorable attribute of dihydrostreptomycin which was noted was irritation of the tissues at the site of injection. The irritation is appreciably more severe than that produced by streptomycin. Intrathecal injection of dihydrostreptomycin is not recommended for the treatment of meningitis unless a less irritant form of the drug can be produced. Patients with meningitis treated with dihydrostreptomycin might be given purified streptomycin intrathecally.

The series of patients reported on here is not sufficiently large, nor is the period of observation sufficiently long, to have revealed all of the possible toxic potentialities of dihydrostreptomycin.

FELDMAN, W. H., KARLSON, A. G., & HINSHAW, H. C. (1948.) **Promin in experimental tuberculosis: antituberculosis effects of sodium P,P^1-Diaminodiphenylsulfone-N, N^1- didextrose sulfonate (promin) administered subcutaneously. (A preliminary report.)**—*Proc. Staff Meet., Mayo Clin.* **23.** 118. [Abst. in *Amer. Rev. Tuberc.* **58.** No. 4. p. 30 of absts. (1948), copied *verbatim.* Signed: P. Q. EDWARDS.] **2373**

Eight groups of guinea pigs, consisting of 12 animals each, were utilized. Each animal was inoculated with 0·1 mg. of the human type of tubercle bacilli (H37Rv). Twenty-six days later, treatment of seven of the groups was started; the eighth group remained untreated for control. One group received promin orally, five groups received variable doses of promin subcutaneously and one group received streptomycin. Treatment was continued for seventy-six days and the experiment was terminated 102 days after the animals had been inoculated with the bacilli. Results indicated that promin given subcutaneously to tuberculous

guinea pigs is fully as effective in its antituberculosis action as the same dose of promin given orally. The parenteral administration of promin did not, in guinea pigs, preclude the development of blood dyscrasia.

KIRKWOOD, S., PHILLIPS, P. H., & MCCOY, E. (1946.) **The antitubercular action of 1,1,1-trichloro-2,2-bis (*p*-Aminophenyl)-Ethane.**—*J. Amer. chem. Soc.* **68.** 2405. [Abst. in *Bull. Hyg., Lond.* **22.** 209. (1947), copied *verbatim.* Signed: H. J. O'D. BURKE-GAFFNEY.] **2374**

This compound gave complete *in vitro* inhibition of growth of *Myco. tuberculosis* at dilutions of 1/100,000 and some inhibition at 1/1,000,000; it was shown by transfer experiments that it was bactericidal at 1/100,000 and bacteriostatic at 1/1,000,000. Feeding experiments *in vivo* in experimentally infected guinea-pigs showed that the compound produced a remarkable control of the tuberculous infection.

"Full experimental details will be published later."

GOLDBERG, A. A., JEFFRIES, H. S., & TURNER, H. S. (1948.) **Tuberculostatic activity and chemical constitution. Part II. The activity of derivatives of diphenylamine-2-carboxylic acid.**—*Quart. J. Pharm.* **21.** 10–16. [Abst. in *Bull. Hyg., Lond.* **23.** 636. (1948), copied *verbatim.* Signed: W. H. TYTLER.] **2375**

The authors have found that ortho-substitution compounds of benzoic acid are more actively inhibitory for *Myco. tuberculosis in vitro* than the meta-, and para-compounds. They have prepared a series of diphenylamine-2-carboxylic acids (N-phenylanthranilic acids), with substituents in one or both benzine rings. The whole series showed high specific activity against *Myco. tuberculosis*, the parent phenylanthranilic acid inhibiting growth completely at 1·5 mgm. per cent. Activity was increased by various substituents, particularly halogens, in the carboxylated nucleus, and by methoxy-, phenoxy-, phenyl-, and phenyl-amino-groups in the non-carboxylated nucleus. Activity was impaired by the presence of amino- or acetamido-groups in either nucleus.

The diphenylamine-2-carboxylic acids have no general bacteriostatic activity, *Streptococcus haemolyticus* and *Staphylococcus aureus* requiring 125 mgm. per cent., while *Proteus vulgaris* and *Ps. pyocyanea* were not inhibited at 500 mgm. per cent. The compounds had a small activity against *Myco. phlei.*

The whole series of some 54 compounds was tested against *Myco. tuberculosis* (H37), the activity being indicated by the minimum concentration giving complete inhibition of growth. For 19 of the compounds the values were under 1·0 mgm. per cent. and for 9 of them from 0·1 to 0·4 mgm. per cent. At concentrations above the bacteriostatic level some bactericidal power was seen. Conversion of the compounds into soluble β-diethylaminoethyl ester hydrochlorides did not appreciably lower the activity.

After oral administration of the compound to guineapigs the urine was inhibitory for *Myco. tuberculosis*, and remained more so than normal for 3 or 4 days. The toxicity (acute and chronic) of a few compounds was estimated in mice by mouth, subcutaneously, and intraperitoneally, the LD 100 values being from 120 to 750 mgm. per kgm. according to the route. Rabbits injected intravenously with 100 mgm. per kgm. daily for 3 days survived.

RAGAZ, L. (1948.) p-Aminosalicylsäure in der Chemotherapie der Tuberkulose. [***p*-Aminosalicylic acid in the chemotherapy of tuberculosis.**]—*Schweiz. med. Wschr.* **78.** 332–334. [Abst. in *Bull. Hyg., Lond.* **23.** 573–574. (1948), copied *verbatim.* Signed: J. B. MCDOUGALL.] **2376**

This article starts with a detailed account of the chemistry of the tubercle bacillus and of the original work of BERNHEIM on the "oxidative faculties" of the tubercle bacillus. The conclusion is that the co-factors in oxygen metabolism of the tubercle bacillus are benzoic and salicylic acids. LEHMANN of Sweden followed up Bernheim's experimental work and confirmed that salicylic acid in particular had a considerable bacteriostatic effect upon tubercle bacilli cultured on a synthetic medium. Experimentally produced tuberculosis in mice can be greatly influenced for the better with *p*-aminosalicylic acid [PAS] (1–2 per cent.)

The duration of life is increased, the lesion often resolves and exudative lesions give place to more proliferative processes. These results have more recently been confirmed by FELDMAN, who found in addition that the tolerance of the guinea-pig to PAS was high.

PAS has only a very slight degree of toxicity. Doses of 2·5 gm. per kgm. body weight given intravenously were tolerated by rats without any ill-effects. Mice are a little more sensitive. PAS is absorbed quickly and completely, but is also eliminated very quickly so that, in order to maintain a sufficient blood level, large and frequent doses are necessary. Clinical trials, conducted by LEHMANN and others, have shown that treatment with large doses of PAS—usually 10–15 gm. distributed throughout the day—for a period of several months, resulted in rapid improvement in 60 to 70 per cent. of relatively advanced cases of pulmonary tuberculosis. There was a gain in weight, drop in temperature, and in the blood

sedimentation rate, and a decrease in the number of bacilli in the sputum. There was rapid relapse when treatment was stopped. The results with tuberculous meningitis and in miliary tuberculosis have, however, been disappointing; in the author's series the drug had no effect on four cases of miliary tuberculosis and three cases of meningitis, though this may have been due to underdosage.

Convincing results have been obtained in the treatment of empyema and tuberculous abscesses and fistulae. The further investigation of the possibilities of PAS is thoroughly justified and is of great interest.

Much work has yet to be done in simplifying the preparation itself from its present complicated chemical structure; when this is done, a final assessment of its value will be possible.

WAGNER, W. H., & VOGELSANG, H. D. (1947.) Über die Entwicklungshemmung humaner Tuberkelbacillen im Reagensglas. II. Phenole. [**Growth inhibition of human tubercle bacilli** *in vitro*. **II. Phenol.**]—*Klin. Wschr.* **24/25.** 237–240. [Abst. in *Bull. Hyg., Lond.* **23.** 636. (1948), copied *verbatim*. Signed: W. H. TYTLER.] **2377**

The authors have tested the bacteriostatic activity of a number of phenol derivatives, and some other compounds, against *Myco. tuberculosis*, using Sauton media inoculated with small portions of surface membrane. The most active substance tested was Solganol which gave complete inhibition at 1 : 1,000,000. Next came *o*-hexyl-, and *o*-heptyl-*p*-chlorphenol (1 : 500,000), 4-chlorthymol, 4-nitrothymol, and 4-iodthymol (1 : 200,000), and 4n-butyl-, 4n-hexyl-, and 4n-octylresorcin (1 : 200,000). A number of other thymol derivatives had values of 1 : 200,000.

The addition of prolin and of glutamic acid to Sauton medium improved the growth.

CAIRNS, J. G. (1947.) **B.C.G. vaccination.**—*Med. Offr.* **78.** 123. [Abst. in *Bull. Hyg., Lond.* **23.** 99. (1948), copied *verbatim*. Signed: CHARLES WILCOCKS.] **2378**

This is a short paper, and the author does not attempt any estimate of the value of BCG in prevention of tuberculosis; this, presumably, may be undertaken later.

At Portsmouth, BCG is given to children, contacts, or nurses, negative to tuberculin, in whom a special risk is recognized and for whom consent is obtained. There is, apparently, no attempt at rigid isolation of contact children from infection, for several weeks before and after vaccination, nor is an alternate-case technique employed. [The author will, therefore, probably have difficulty in obtaining unequivocal evidence of benefit.] He has established that in most of the persons vaccinated, the tuberculin test became positive, and that the intradermal method of vaccination with a Gothenburg strain of BCG is free from risk.

UNGAR, J. (1949.) **Viability of freeze-dried BCG cultures.**—*Tubercle, Lond.* **30.** 2–4. [Author's summary copied *verbatim*.] **2379**

During the process of freeze-drying described in the paper about 60 per cent of the organisms remain viable. The viability of the freeze-dried culture remains unaltered over a period of at least twelve months. Freeze-dried cultures seem to maintain their antigenic properties, as indicated by tuberculin sensitivity and by resistance to subsequent infection with a challenge of a virulent strain. The freeze-drying of BCG suspensions might be suitable for the maintenance of stock cultures and cultures for the preparation of BCG vaccines.

PATERSON, J. C., CROMBIE, D. W., & COLES, J. C. (1949.) **Protection by killed vole bacillus vaccine against experimental tuberculosis in guinea pigs.**—*Canad. J. Res.* Sect. E. **27.** 37–42. **2380**

One group of 50 g. pigs was vaccinated with vole bacilli killed by ultraviolet light, a second group of 50 was vaccinated with BCG and a third group of the same size were held as controls. A challenge dose of 0·25 mg. of human tubercle bacilli was given by the subcutaneous route 28 days after the last injection of vaccine. The average survival time for the control group was 33 days, that for the vole vaccine group was 64 days, and that for the BCG group 73 days. The difference in survival times was particularly impressive at the 58th day, when all of the control animals had died while only 49% of the BCG group and 59% of the vole group had succumbed. The degree of protection from the killed vaccine was comparable to that obtained from BCG, and the results suggest that further work on this material should be carried out since the advantages of a vaccine made from dead organisms only are obvious. A smaller infecting dose or a less virulent strain are suggested as modifications for future experiments.—R. GWATKIN.

GRÖNWALL, A. (1947.) **Physicochemical analysis of protein antigens isolated from the tubercle bacillus.**—*Upsal läkaref. förh.* 30th June. p. 227. [Abst. in *Amer. Rev. Tuberc.* **58.** No. 5. p. 38 of absts. (1948), copied *verbatim*. Signed: R. W. CLARKE.] **2381**

The purpose of this paper is to provide data from electrophoresis experiments concerning the insoluble residue of tuberculin, this being the fraction left after extraction by water and alcohol-ether mixtures. The extraction and electro-

phoresis methods are described in detail. The principle fractions found in the residue mixture were identified as nucleic acid, a protein, and a carbohydrate. The protein has a very high tuberculin activity.

SARTORY, A., MEYER, J., & LANGE, J. M. A. (1947.) Préparation de différentes lipases pancréatiques et leur influence sur les propriétés morphologiques et culturales des bacilles acido-résistants. **[The preparation of different pancreatic lipases and their influence on the morphological and cultural properties of acid-fast bacilli.]**—*Bull. Acad. Méd. Belg.* **131.** 19–24. [Abst. in *Bull. Hyg., Lond.* **22.** 415. (1947), copied *verbatim.* Signed: S. ROODHOUSE GLOYNE.] **2382**

The authors have continued some experiments begun by one of them before the war on the effect of pancreatic extract on the morphology and pathology of the tubercle bacillus. In the present paper they record the effects of five different lipase preparations on *Myco. tuberculosis* of the Vallée strain and on timothy grass bacillus. Two of the preparations, one prepared by the Willstaetter and Waldschmitt-Leitz and the other by the Penaud technique, yielded significant results. These showed that cultures of the bacilli on glycerinated potato juice, to which the glycerinated lipase extract had been added in strengths of 40–50 per cent., modified the growth of the bacillus so that the organisms were agglutinated in masses in which there were many pleomorphic non-acid-alcohol-fast forms which became typically acid-fast on subculture on fresh potato media.

BERCZELLER, A., & FRANK, G. (1946.) **False acid-fast bacilli.**—*Quart. Bull. Sea View Hosp.* **8.** 187. [Abst. in *Amer. Rev. Tuberc.* **55.** No. 5. p. 158 of absts. (1947), copied *verbatim.* Signed: P. Q. EDWARDS.] **2383**

Sudden increase in the number of acid-fast bacilli on smears from the chest wound (operative) of a tuberculous patient raised the question of false acid-fastness, in so far as the wound had been treated with sulphathiazole ointment prior to the noteworthy increase in bacilli. Several days after discontinuance of the ointment, the acid-fast bacilli present on smears decreased appreciably. Experimental *in vitro* reduplication of the phenomenon proved that diphtheroids, as well as *B. megatherium* and *B. coli*, are capable of being so coated with hydrous lanolin or petrolatum that they became acid-fast. This artefact may be eliminated by soaking fixed unstained smears successively in chloroform, ether and alcohol.

MORSE, E. V., & ROBERTS, S. J. (1948.) **Bovine pyelonephritis: a concurrent infection with *Corynebacterium renale* and *Escherichia coli*.**—*Cornell Vet.* **38.** 429–435. **2384**

Two months after a dystocia a 8-year-old Holstein cow was noticed to be losing weight and passing blood clots and pus in the urine. Examination revealed enlargement of the left kidney and both ureters. The right kidney was not palpable. Fluid containing pus and clots was found in the vagina. Treatment with sulphamethazine proved unsuccessful; and after a further examination, slaughter was advised. P.M. findings were typical of bovine pyelonephritis.

Bacteriological examination of urine samples taken at various times during life revealed both *C. renale* and *Bacterium coli*, but P.M. only *C. renale* was recovered, from the left ureter and left kidney; *B. coli*, however, was predominant in the bladder.

C. renale was regarded as the primary agent with *Bact. coli* as a secondary invader. Embryotomy had been performed to relieve the dystocia and it is thought that this operation may have allowed introduction of the organisms.—L. G. DONALD.

AITKEN, W. A. (1949.) **Penicillin in swine erysipelas.**—*N. Amer. Vet.* **30.** 25. **2385**

The author recommends one thousand units of crystalline penicillin dissolved in one-third of a ml. of erysipelas serum for each lb. body weight, repeated 12–24 hours later.—W. R. BETT.

VAN DOORMAAL, T. A. J. (1948.) De behandeling van "erysipeloid" met penicilline. **[The treatment of "erysipeloid" with penicillin.]**—*Ned. Tijdschr. Geneesk.* **92.** 165–169. [Abst. from abst. in *Bull. Hyg., Lond.* **23.** 249. (1948), copied *verbatim.*] **2386**

The occurrence and clinical forms of erysipeloid are briefly dealt with. Its penicillin treatment is discussed. Three personal observations are recorded, in which 500,000 U. penicillin in 25 injections of 20,000 U. each every three hours sufficed to obtain complete and final recovery. Penicillin treatment seems to be more efficient than anti-specific-serum therapy. Also there is no serum disease to be feared.

STANLEY, N. F. (1949.) **Studies on *Listeria monocytogenes*. I. Isolation of a monocytosis-producing agent (MPA). II. Rôle of listeria in infectious mononucleosis.**—*Aust. J. exp. Biol. med. Sci.* **27.** 123–131 & 133–142. **2387**

I. A lipoid fraction capable of causing a monocytic response was isolated from *Erysipelothrix* (*Listeria*) *monocytogenes*. This fraction was serologically inactive and of low toxicity, but produced a profound monocytosis in both normal rabbits and rabbits immunized against the intact organism.

II. Twenty consecutive cases of infectious mononucleosis were examined for possible association with *E. monocytogenes*. These cases fell into three serological groups depending on the titres obtained with the modified Paul Bunnell test and the listeria agglutination test. It was concluded that some cases of the disease might be due to *Listeria* infection.—N. WICKHAM.

LARSEN, C. E. (1948.) **Sulfamethazine in the treatment of pasteurellosis and dysentery in swine.**—*Vet. Med.* **43.** 231–235. **2388**

Sulphamethazine intraperitoneally at the rate of one gr. per lb. body weight gave a 95% recovery rate in 180 cases of pasteurellosis in pigs.

In swine dysentery, an acute highly fatal disease characterized by bloody diarrhoea in which a vibrio may be implicated, this drug given intraperitoneally or in the feed at the rate of 0·5% resulted in the recovery of 118 out of 119 cases treated.—D. LUKE.

MCNEIL, E., & HINSHAW, W. R. (1948.) **The effect of streptomycin on *Pasteurella multocida in vitro* and on fowl cholera in turkeys.**—*Cornell Vet.* **38.** 239–246. **2389**

The authors studied the effects *in vitro* and *in vivo*, of streptomycin on *Pasteurella multocida*. Ten strains isolated from birds were used in the *in vitro* trials and for the *in vivo* tests a strain isolated from an acute outbreak of pasteurellosis in turkeys was used.

The results of the *in vitro* trials are in agreement with those of other workers in that the activity of streptomycin is greater in a poor medium such as meat extract broth than in an infusion broth.

Streptomycin at the rate of 25,000 units per kg. body weight prevented death when given at the time of inoculation of the pasteurella. When streptomycin was given 6–24 hours after the organism there was a great increase in the number of carriers and there was joint involvement in five out of seven birds thus treated.—D. LUKE.

DE MENDONÇA MACHADO, A. (1945.) Salmonelas e salmoneloses. **[Salmonella infections of domestic animals.]**—*Repos. Lab. Pat. vet., Lisboa.* **6.** 35–58. [English, French and German summaries.] **2390**

An account of routine diagnostic findings over a period of 17 years at the Central Veterinary Laboratory in Lisbon.

Salmonella infections of pigs are chiefly caused in Portugal by *S. cholerae-suis* var. *kunzendorf*.

Salmonella were isolated from cattle and horses, including *S. abortus-equi* in the latter. *S. gallinarum* and *S. pullorum* infections in fowls were dealt with.

Pigs are the animals most frequently infected by salmonella.—F. A. ESTEVES.

METCOFF, J., DARLING, D. B., SCANLON, M. H., & STARE, F. J. (1948.) **Nutritional status and infection response. 1. Electrophoretic, circulating plasma protein, hematologic, hematopoietic, and immunologic responses to *Salmonella typhimurium* (*Bacillus aertrycke*) infection in the protein-deficient rat.**—*J. Lab. clin. Med.* **33.** 47–66. **2391**

The response to infection with *S. typhimurium* was observed in two groups of rats, one fed an adequate, the other a protein-deficient diet.

Protracted protein deficiency produced a depletion of albumin and γ-globulin in the blood serum. Infection had no influence on these changes. Protein deficiency was further associated with an increase of immature myeloid forms and a diminished erythropoietic activity. There was a decrease of haemoglobin in infected animals, slightly more marked in the protein deficient ones. Incidence and duration of bacteraemia did not differ in the two groups; the antibody titres after infection and after secondary antigenic stimulation were again approximately equal in both groups. In spite of the increase in antibody no increase in γ-globulin was observed in either group. From these results severe protein deficiency did not seem to impair the antibody response to the infection.—A. MAYR-HARTING.

VACCARO, H., PÉREZ, M., & FINCHEIRA, O. (1945.) Investigación de las Salmonellas aviarias en nuestro pais. **[A study of local strains of avian *Salmonella*.]**—*Biológica, Santiago.* No. 3. pp. 69–92. [English summary.] **2392**

In an investigation of the presence of salmonella in 300 fowls of different ages the authors examined 477 samples consisting of faeces, liver, spleen, intestines, ovaries, kidneys, bile, lungs, brain, unabsorbed yolk sac, testes, pancreas, heart and pericardial fluid. A serological study of the salmonella species isolated was made according to the Kauffman-White scheme.

Of the 300 birds, 56 (18·66%) were found to be positive for salmonella, distribution being in inverse ratio to age: in chicks less than 15 days old the frequency was 24%, in young birds 15 days—6 months old it was 16·41% and in adult fowls 13·88%.

Of the 477 samples examined 72 were positive for salmonella (15·09%). Distribution in the various organs was: intestine 81·13%, faeces 3·98%, liver 5·19%, spleen 4·54%, ovary 6%, bile 15%, lungs 15%, kidneys 10%, yolk sac, testes and heart being positive in one out of ten, one out of ten and four out of four samples respectively. The species isolated were *S. typhi-*

murium 44, *S. gallinarum* 13, *S. bredeney* 13, *S. reading* 9, *S. london* 3, *S. derby* 1, *S. enteritidis* 1, and *S. anatum* 1. *S. pullorum* was not isolated; the authors attribute this to the use of efficacious prophylactic measures by breeders. Its absence was the reason for the difference in the distribution of the disease process: whilst pullorum lesions in chicks take a septicaemic form, in the present study the lesions were localized.

From their study of the foreign literature the authors believe that this is the first time that *S. reading* has been isolated from fowls.

—R. Macgregor.

Anderson, G. W., Cunningham, J. D., & Johnston, R. A. (1949.) **Examination of suspicious pullorum reactors.**—*Canad. J. comp. Med.* **13.** 94–96. **2393**

In the course of two years of official testing for pullorum disease by the whole blood and tube methods, 142 birds out of more than 1,600,000 tested were regarded as suspicious. They were obtained for retesting and bacteriological examination. *Salmonella pullorum* was isolated from 31 (21·8%) of the birds. Eight of nine cockerels examined were found to be harbouring the organism. The variant form of *S. pullorum* was more frequently isolated. Many birds with signs of pathological conditions were found to be harbouring organisms other than *S. pullorum*, which yielded non-pullorum (non-specific) reactions with pullorum antiserum.—R. Gwatkin.

Kraneveld, F. C., Erber, M., & Mansjoer, M. (1947.) Salmonella-infecties bij eenden op Java. **[Salmonella infection in ducks in Java.]** —*Ned.-ind. Bl. Diergeneesk.* **54.** 120–136. [Abst. from English summary.] **2394**

Salmonella organisms were isolated from 14 out of 71 ducks, from the organs, particularly the genitalia, the blood and faeces. Eighty-two eggs [out of a total not stated] were free from *Salmonella*.

Sixteen strains were tested serologically and by culture and identified as *S. typhi-murium*. Pathogenicity was tested in rodents and turtle doves resulting in the death of these animals.

In ducks injections of 5 ml. of a culture suspension and 10 ml. given *per os* had no effect. The ducks, however, became *Salmonella* carriers and cultures were obtained from spleen, genitalia and intestinal contents. Serum of 310 ducks was tested by agglutination with living antigens. In 19 drakes, one of which was a known *Salmonella* carrier, the result of the agglutination test was negative.—E. G.

Kraneveld, F. C., Erber, M., & Mansjoer, M. (1947.) Salmonella-dragers onder kalkoenen op Java. **[Salmonella carriers among turkeys in Java.]**—*Ned.-ind. Bl. Diergeneesk.* **54.** 149–152. [Abst. from English summary.] **2395**

S. meleagridis was demonstrated in two out of 12 healthy turkeys. Cultures were obtained from the liver, kidneys and testes of a cock bird and from the ovaries, an abnormal egg-follicle and the proventriculus of a hen.—E. G.

Zaki, R. (1948.) ***Brucella abortus* infection among buffaloes in Egypt.**—*J. Comp. Path.* **58.** 73–79. **2396**

Samples of the milk of 200 buffaloes from different dairies in Cairo were examined by culture, g. pig inoculation and the agglutination test. *Brucella abortus* was isolated from four samples by culture. G. pigs acquired brucella infection from 30 samples (15%) and positive agglutination tests were obtained with 16 samples (8%).

In tests of the blood serum and milk of another series of 200 buffaloes examined at an abattoir, 75 (37·5%) of the blood samples gave a positive reaction and 20 (10%) of the milk samples. None of the 125 buffaloes with an agglutination reaction to the blood serum test was found to excrete brucella organisms in the milk.—J.I.T.

Campbell, A. D., & Rodwell, A. W. (1949.) **Experimental investigation of calfhood vaccination with *Brucella abortus* Strain 19. Resistance of vaccinated calves against natural infection.**—*Aust. vet. J.* **25.** 46–52. **2397**

Two groups of heifers, one vaccinated with Strain 19 *Brucella abortus* (27 animals) and the other unvaccinated (29 animals) were exposed to infection during pregnancy by running them in a paddock with twelve pregnant heifers which were caused to abort by inoculations of virulent *Br. abortus*. Of the vaccinated heifers 3·7% developed a positive agglutination reaction and aborted. Of the unvaccinated animals 62% developed positive agglutination reactions and 34·5% aborted.—D. C. Blood.

Howe, C., & Heyl, J. T. (1948.) **Streptomycin treatment in acute brucellosis. Report of a case with review of the literature.**—*New Engl. J. Med.* **238.** 431–434. [Abst. in *Bull. Hyg., Lond.* **23.** 508–509. (1948), copied *verbatim*. Signed: J. C. Cruickshank. **2398**

The *Brucella* species are susceptible to streptomycin *in vitro*, but the results of streptomycin therapy in laboratory trials and in human cases have been equivocal. Of the adequately documented human cases, treated with various doses, it would appear that about half showed no response and the remainder a decrease of temperature or other sign of improvement. A satisfactory response was only found in cases attaining

a blood level of 20–30 microgm. per ml. or receiving 6 gm. of streptomycin daily.

The authors describe a severe case of infection with *Br. abortus* in a man aged 52. After a period of 58 days, during which time the temperature had been swinging up to 102°F. or higher each day, streptomycin treatment was begun. The drug was given in a total dosage of 60 gm., 1 gm. being given every four hours for 10 days, at first intramuscularly, but later intravenously during the daytime owing to the severe pain at the site of the intramuscular injections. During the last five days of treatment temperature fell to normal and the patient recovered steadily. During convalescence there was considerable dizziness, probably a toxic effect of the large dosage of streptomycin.

TOVAR, R. M. (1947.) Incidencia de brucelosis y tularemia en Mexico. Determinación de reactores serologicos humanos. [**The incidence of brucellosis and tularaemia in Mexico—detection of human serological reactors.**]—*Rev. Inst. Salubridad y Enfermedales Trop.* **8.** 39–48. [Abst. in *Bull. Hyg., Lond.* **23.** 107. (1948), copied *verbatim.* Signed: J. C. CRUICKSHANK.] **2399**

The author examined the sera of 37,000 labourers, submitted for Wassermann test from various parts of Mexico, for agglutinins to *Br. melitensis*, *Br. abortus* and *Br. tularensis*. The method used consisted in a rapid slide test with a concentrated polyvalent antigen, followed by slide and tube tests of positively reacting sera with standardized monovalent suspensions. Agglutinins to *Br. melitensis* or *Br. abortus* were found in 1,000 sera (2·7 per cent.), the titre in 950 of these being 1/80 or over; 96·4 per cent. of the positive sera reacted with *Br. melitensis*. The figures support the view that *Brucella* infection, due specially to *Br. melitensis*, is widespread in Mexico. The source of these infections is mainly fresh cheese and cream from the large herds of goats kept in the rural districts.

Agglutinins to *Br. tularensis* were found in 500 sera, of which 200 were positive at titres of 1/160 or over. The positive sera were obtained mainly from the central and southern districts of the country.

Ten per cent. of the sera positive to *Br. melitensis* and *Br. abortus*, and 15 per cent. of the sera positive to *Br. tularensis*, gave cross-reactions which might have led to error in diagnosis.

QUANDER, J. (1947.) Nordische Bradsot in Schleswig-Holstein. [**Norwegian Bradsot** (*Clostridium septicum* **infection) in sheep in Schleswig-Holstein.**]—*Berl. Münch. tierärztl. Wschr.* No. 10. pp. 118–119. **2400**

An outbreak of bradsot inflicted heavy losses on two sheep farms in the spring of 1947.

Bacillus parasarcophysematos [*Cl. septicum*] was cultivated from the exudate, the blood and the organs.—E. G.

OAKLEY, C. L., WARRACK, G. H., & WARREN, M. E. (1948.) **The Kappa and Lambda antigens of** *Clostridium welchii*.—*J. Path. Bact.* **60.** 495–503. [Authors' summary copied *verbatim.*] **2401**

Cl. welchii κ toxin attacks gelatin. It produces local swelling on intramuscular injection and a local haemorrhage and necrotic reaction on intracutaneous injection. It is probably lethal on intravenous injection. Death after intravenous injection is associated with massive haemorrhages into the lungs.

Toxin production by different types of *Cl. welchii* under suitable conditions may be summarised thus:—Types A and C produce κ toxin. Type B produces an antigen lambda (λ), not previously described, which attacks hide powder and azocoll but fails to attack collagen; it probably attacks gelatin. Fresh normal sera contain a λ inhibitor distinct from λ antibody produced by immunisation. Type E produces both κ and λ. Type-D strains show great diversity. Some produce κ and some λ, some possibly both and some neither.

It must be emphasised that hide powder and azocoll are not reliable as indicators for collagenases, because they are attacked by enzymes that do not attack collagen.

ORY, E. M., & GROSSMAN, L. A. (1948.) **The management of tetanus with curare: Report of two cases.**—*Amer. J. med. Sci.* **215.** 448–450. [Abst. in *Bull. Hyg., Lond.* **23.** 952. (1948), copied *verbatim.* Signed: A. JOE.] **2402**

Two cases of severe tetanus are described in this paper. Both were treated with tetanus antitoxin and penicillin, and such sedatives as codeine and the barbiturates. In addition, curare in the form of intocostrin injections was given with a view to reducing muscle spasm. The first patient received 9 intravenous injections averaging 40 units each during the first four hospital days. Although muscular contractions were not completely controlled the subjective relief provided was more impressive than the objective signs of improvement, and curare was more effective than codeine in controlling pain. In the second patient, 140 units of intocostrin were given intravenously in divided doses and thereafter in 40-unit doses intramuscularly at intervals of 4 hours. Muscle spasm and trismus were completely controlled, but relaxation was so marked that the tongue dropped back and occluded the glottis. The

accumulation of mucus in the respiratory tract was also troublesome. Both patients recovered and the authors are obviously in favour of the use of curare in tetanus. They emphasize, however, the dangers inherent in its use and insist on constant attention to the patient, with neostigmine or physostigmine always in readiness at the bedside. A keen watch must be kept for respiratory paralysis; if this occurs there should be prompt application of artificial respiration until the curare antagonist, neostigmine, can be administered.

VOGELSANG, E. G. (1946.) Necrobacilosis de animales domésticos y salvajes observados en Venezuela. **[Necrobacillosis of domestic and wild animals in Venezuela.]**—*Rev. Med. vet. Parasit., Caracas.* **5.** 3–11. **2403**

In the rabbit, lesions are found in the mouth and surrounding tissues and in the lungs.

In pigs, infection occurs in dental alveoli following extraction of the tusks of piglets. A case of necrotic mastitis in the sow has been described.

In the horse, the infection may localize in the withers, poll, or sternal cartilage, or it may gain entrance wherever there is wounding, for example in the commissures of the lips, the dental alveoli and the metatarsal region.

Localization of infection in cattle is mainly in the liver, but sometimes in broken horns. In calves, the umbilical cord is occasionally involved.

Among captive wild animals, infection was found in a young deer, taking the form of collections of superficial abscesses with verrucose surfaces, and in a kangaroo, in which the lower incisors were surrounded by necrotic material, rich in necrosis bacilli.—I. W. JENNINGS.

MARIA, J., Jr., & QUEVEDO, C. (1947.) Somera descripcion de una enfermedad de reciente comprobacion en Argentina: leptospirosis bovina, o icterohemoglobinuria infecciosa de los bovinos. **[Bovine leptospirosis: a new disease in Argentina.]**—*Rev. Med. Vet., B. Aires.* **29.** 904–913. **2404**

The authors note the presence of bovine leptospirosis in cattle in Argentina. The disease is acute or subacute, and its onset is marked by haemoglobinuria, followed by anaemia or jaundice. There is an ocular discharge, with intense photophobia. The mortality is not high. Leptospira lysis tests give high titres with *L. icterohaemorrhagiae* and *L. suis* antigens. Penicillin, given in large doses, seems to ameliorate the course of the disease.—I. W. JENNINGS.

DRENOWSKI, A. K. (1947.) Eine kleine Weil-Epidemie in Bulgarien. **[A small outbreak of Weil's disease in Bulgaria.]**—*Schweiz. med. Wschr.* **77.** 1333. [Abst. in *Bull. Hyg., Lond.* **23.** 179–180. (1948), copied *verbatim.* Signed: H. J. O'D. BURKE-GAFFNEY.] **2405**

This is a brief description of a small epidemic of Weil's disease which occurred in the middle of 1944 in Northern Bulgaria: in all, 45 soldiers and two civilians were attacked. The clinical features are described and points of note were absence of jaundice in most cases, the early haemorrhages under the skin and mucous membranes, the presence of a relative oliguria, sometimes for 3 or 4 days, and the low temperature recorded in some cases.

The diagnosis was confirmed by dark-ground examination of peritoneal fluid of guineapigs injected with blood from patients. The infecting organism is stated to have been *Leptospira icterohaemorrhagiae* and it is believed that the patients were infected by bathing in the river Lom, and that this had been contaminated with urine from the water rat *Arvicola amphibius s. aquaticus.*

SIGUIER, F., & POULET, J. (1947.) Forme rénale pure de leptospirose pomona chez un porcher. **[Pure renal type of *Leptospira pomona* infection in a swineherd.]**—*Bull. Mém. Soc. Méd. Hôpit., Paris.* Nos. 26/27. 797–799. [Abst. in *Bull. Hyg., Lond.* **23.** 857. (1948), copied *verbatim.* Signed: J. C. BROOM.] **2406**

This patient did not present the usual symptoms of "swineherd's disease"—meningeal irritation, conjunctival injection, rash and digestive disturbances. Instead there were signs of marked involvement of the kidney, with reduction of urinary output and an increase of the blood-urea to 80 mgm. per 100 ml. Tests carried out 3 months after recovery showed the kidney functions to have returned to normal.

JAKOB, A. (1947.) Ueber die Morphologie der *Leptospira canicola.* Untersuchungen mit dem elektrostatischen Elektronenmikroskop. **[The morphology of *Leptospira canicola.* Investigations with the electron microscope.]**—*Med. Klinik.* **42.** 22–25. [Abst. in *Bull. Hyg., Lond.* **23.** 1002. (1948), copied *verbatim.* Signed: J. C. BROOM.] **2407**

In old cultures of one particular strain of *Leptospira canicola* fine threads with a terminal egg-shaped body regularly appeared in addition to leptospirae of normal form. These aberrant types did not occur when subcultures were made at frequent intervals, and all efforts to incriminate them as contaminants failed. From a fancied resemblance to spermatozoa they were designated S-forms. Ordinary microscopical methods revealed no definite morphological characteristics, so preparations were examined in the electron-microscope. The pear-shaped enlargement was about $1{\cdot}5\mu \times 0{\cdot}7\mu$, and showed great variability

in appearance. Some presented as homogeneous, structureless masses, while others consisted of alternate bands of light and dark material, surrounded by a delicate membrane.

These forms are considered to result from growth in an unfavourable medium, but whether they occur in man or animals, or whether they play any part in the epidemiology of leptospirosis, remains undetermined.

ABDOELRACHMAN, R. (1947.) **Comparative investigations into the influence of the presence of bacteria on the life of pathogenic and apathogenic leptospirae.**—*Antonie van Leeuwenhoek ned. Tijdschr. Hyg. Microbiol.* **13.** 21–32. [Abst. in *Bull. Hyg., Lond.* **23.** 73. (1948), copied *verbatim.* Signed: J. C. BROOM.] **2408**

This investigation was carried out to decide the validity of Zuelzer's contention that the presence in water of free-living leptospirae is an indication of the possible existence of pathogenic varieties, and hence of the potential infectivity of the water. In the experiments, culture medium was seeded with both leptospirae and bacteria. Examinations were made at intervals up to six weeks to determine the effect of bacterial growth on the viability and multiplication of the leptospirae. The pathogenic leptospirae, *Leptospira icterohaemorrhagiae*, *L. grippotyphosa* and *L. canicola*, were compared with three strains of the free-living water *L. biflexa*. *Mycobacterium rubrum* was taken as a representative of soil organisms; *Pseudomonas fluorescens*, *Ps. punctata*, *Ps. putida*, *Spirillum serpens*, *Micrococcus albus* and *Azobacter agilis* as water bacteria; *Bacterium aerogenes*, *Bact. coli*, *Streptococcus faecalis*, and *Salmonella typhi* and *Salm. paratyphi* as examples of normal and pathogenic intestinal bacteria respectively.

It was found that *Myco. rubrum*, *Az. agilis* and *Str. faecalis* were without effect on the growth of any of the leptospira species. The *Pseudomonas* spp., *Bact. aerogenes* and *Sp. serpens* inhibited growth except in the case of one strain of *L. biflexa* which was little affected by the presence of any bacteria. The other bacterial species were intermediate in their actions but, in general, they inhibited the pathogenic species and had little effect on the free-living leptospirae.

From these results the author concludes that Zuelzer was unjustified in her contention.

STEPHENSON, M., & GALE, E. F. (1948.) **Metabolic processes in micro-organisms.**—*Brit. med. Bull.* **5.** 305–307. **2409**

This is a historical review of our knowledge of bacterial metabolism, including the quantitative studies on fermentation chemistry by Harden, and his discovery of the role of phosphorylation; the role of growth factors; the study of mutations involving loss of genes that control enzymes. All these processes have a bearing also on the biochemistry of higher organisms. In addition some studies are reported on the enzymatic mechanism by which pathogenic microorganisms act in the host. The most important section of the review is that on chemotherapy, discussing the significance of the antagonizing action of *p*-aminobenzoic acid to the sulphonamides, the mechanism of the action of antibiotics, and the difference between Gram-positive and Gram-negative organisms.

—A. MAYR-HARTING.

EAGLE, H., & STEINMAN, H. G. (1948.) **The nutritional requirements of treponemata. I. Arginine, acetic acid, sulfur-containing compounds, and serum albumin as essential growth-promoting factors for the Reiter treponeme.**—*J. Bact.* **56.** 163–176. **2410**

Many unsuccessful attempts have been made to cultivate the causative organism of syphilis in both natural and synthetic media. In this investigation the authors continued the examination of the nutritional requirements of the Reiter treponema, a non-pathogenic organism purporting to have been cultivated from a syphilitic lesion, hoping that clues might arise for the growth requirements of *Treponema pallidum*. A mixture of acetic acid, arginine, a sulphur-containing (–SH) compound, crystalline serum albumin [see DUBOS, R. J., & DAVIS, B. D., *V. B.* **16.** 423, and also SPRINCE, H., & KUPFERBERG, A. H., *V. B.* **19.** 51.] plus small amounts of yeast extract, enzymatic casein digest and glucose allows multiplication. Acetic acid replaces the dialysable components of whole serum and crystalline albumin the non-dialysable fraction.—M. W.

PENNANÉAC'H, MORAND & GUENNEC. (1947.) Note sur l'application des colorants d'oxydoréduction à la recherche rapide de la pénicillosensibilité des germes en aérobiose. **[Note on the application of oxidation-reduction indicators to the rapid determination of the penicillin-sensitivity of bacteria under aerobic conditions.]** —*Rev. Méd. Nav.* **2.** 387–393. [Abst. in *Bull. Hyg., Lond.* **23.** 349. (1948), copied *verbatim.* Signed: L. P. GARROD.] **2411**

Glucose broth with phosphate buffer and either methylene blue or brilliant cresyl blue is prepared containing different concentrations of penicillin. A series of such tubes is inoculated with the organism to be tested and the end-point read by colour, growth causing decolorization of the medium. A result can be obtained in as little as 3 or 4 hours with some bacterial species: others grow more slowly. It is suggested that such tubes can be inoculated directly from a specimen [pre-

sumably if this contained more than one bacterial species the result might be misleading].

HASLETT, A. S. W. (1948.) **The Gram test for bacteria. Its chemical significance.**—*S. Afr. med. J.* **22.** 354–355. **2412**

H. reviews briefly the relationship of penicillin sensitivity of organisms and their Gram reaction. No original results are given [see also HENRY & STACEY, *V. B.* **14.** 190].—M. S. B.

JETTMAR, H. M. (1947.) Ueber die Lebensdauer angetrockneter Mikroben (Tamponmethode). **[The viability of dried bacteria (swab method).]** —*Wien. med. Wschr.* **97.** 465–467. [Abst. in *Bull. Hyg., Lond.* **23.** 121. (1948), copied *verbatim.* Signed: J. C. CRUICKSHANK.] **2413**

Cotton wool swabs were coated thickly with organisms grown on blood agar plates, and stored at different temperatures in tubes closed with ordinary wool plugs or sealed with paraffin. Viable haemolytic streptococci, diphtheria bacilli, typhoid and paratyphoid bacilli, and *Bact. coli* were recovered from swabs kept in loosely plugged tubes at room temperature for periods of 12 months and, in certain instances, for much longer periods. *Str. viridans* and dysentery bacilli were recovered after 5 and 10 months respectively.

LORD STAMP. (1947.) **The preservation of bacteria by drying.**—*J. gen. Microbiol.* **1.** 251–265. **2414**

Several methods of drying bacteria for preservation were compared quantitatively by viable counts of the survivors, and the best conditions for preservation determined.

Slow drying over P_2O_5 gave better results than rapid freeze-drying processes with *Chromobacterium prodigiosum* as test organism, but drying over P_2O_5 was unsatisfactory with *Vibrio cholerae*, with *Fusiformis* and with *Neisseria* spp. These latter organisms can successfully be preserved by freeze-drying methods. Melted nutrient gelatin proved to be the most suitable suspending medium for the organisms. The survival rate was increased markedly by the addition of 0·2–0·5% ascorbic acid. Higher concentrations of ascorbic acid exercised an unfavourable effect unless the acid was neutralized. Virulence and other characteristics of pathogenic organisms were found unimpaired four years after drying over P_2O_5 and storing *in vacuo*.—A. MAYR-HARTING.

See also absts. **2547** (tetanus toxin); **2560** (in milk); **2562** and **2563** (pasteurization); **2567** (swine erysipelas); **2586-2590** (technique).

DISEASES CAUSED BY PROTOZOAN PARASITES

MILLER, M. J., & FIRLOTTE, W. R. (1948.) **Studies on amoebiasis in Canada. Part II. A method for obtaining viable cysts of *Entamoeba histolytica* free from bacteria.**—*Canad. J. Res.* Sect. E. **26.** 299–302. **2415**

In order to obtain the cysts free from bacteria the authors thoroughly washed faecal samples by means of centrifugation in water and then Ringer's solution. The cysts were then floated in zinc sulphate solution, picked off and again washed in sterile Ringer's. They were transferred by means of a micropipette to a solution of penicillin and streptomycin in sterile Ringer's solution, five transfers into fresh solutions of the antibiotics being made. A modified micropipette is described.—W. E. SWALES.

DIKMANS, G. (1948.) **The dog, *Canis familiaris*, a new host of *Balantidium* sp.**—*Proc. helminth. Soc., Wash.* **15.** 40–41. **2416**

Examination of the liquid contents of the large intestine of a dog affected with severe diarrhoea revealed a large number of *Balantidium* sp. P.M., ulcerated areas were found in the intestine. *Balantidium* has not been previously reported as a parasite of dogs.—G. M. URQUHART.

FORD, J., WHITESIDE, E. F., & CULWICK, A. T. (1948.) **The trypanosomiasis problem.**—*E. Afr. agric. J.* **13.** 187–194. **2417**

There are three main lines of approach to the trypanosomiasis problem, namely (a) through the causal organism, (b) through the vector, tsetse flies, and (c) through the broad ecological method seeking to modify the whole environment so that it becomes inimical to the continuance of the disease. These methods are discussed and it is concluded that coordination of work on all three methods is essential to the solution of the problem and that a new assessment of the problem in all its ramifications is required.—M. C.

VANDERPLANK, F. L. (1947.) **Seasonal and annual variation in the incidence of trypanosomiasis in game.**—*Ann. trop. Med. Parasit.* **41.** 365–374. **2418**

In a previous paper [*V. B.* **12.** 529.] the author suggested that trypanosomiasis in game animals shot in the tsetse fly areas of Shinyanga and Ukerewe, Tanganyika Territory, had a definite seasonal variation and was more commonly associated with young animals. Further data are presented.

The author's results were obtained from 378 game animals, of 38 species, the majority being from the Shinyanga area. Infection rate was highest in giraffe (37%); in roan, eland, zebra, impala and warthog there was an infectivity which varied between 20% and 11%. One out of six elephants was infected. *T. congolense* was the most common species, *T. vivax* was not uncommon,

T. brucei was almost absent. In contradiction to the findings mentioned in his previous paper, young animals did not harbour appreciably greater numbers than adults.

The author recorded an annual variation in incidence of trypanosomes, and found a decline in infection from 43% in 1940 to 9% in 1943. In correlation with the latter, he found a decrease in infected tsetse flies, although the fly population remained constant. Seasonal variation in the fly population occurred, being highest at the end of the rains (April-May) and lowest at the end of the dry season (Oct.-Nov.).

When assessing tsetse fly density in a locality, all fully engorged *G. swynnertoni* taken were examined and their blood meals classified by measuring erythrocytes. Favoured hosts for this fly appeared to be giraffe and the larger antelopes. It is suggested that most of the latter become infected soon after birth and tolerate the trypanosomes for the rest of their lives, but under adverse conditions relapses and superinfections occur even with the same trypanosome strain.

Laboratory observations on the course of infection of *T. rhodesiense* and *T. congolense* in various wild animals are noted. Most animals had trypanosomes in their blood at irregular intervals.

The author discusses his results on an ecological basis.—F. S. McCULLOUGH.

MUDALIAR, S. V. (1945.) **Studies on a variant of *Trypanosoma evansi* in a buffalo.**—*Proc. Indian Acad. Sci.* Sect. B. **21.** 101–105. **2419**

M. describes a small trypanosome from the blood of a female buffalo having a wide morphological difference from *T. evansi*, and calls it *T. evansi* var. *ravi*. On an average it measured 21μ in length and 1–2·5μ in breadth. The nucleus, situated a little anterior to the middle, consisted of loosely lying fragments of chromatin and the kinetoplast was at the extreme posterior end or very close to it. The undulating membrane was ill-developed as compared with *T. evansi*. In biological tests rabbits appeared to be more susceptible than g. pigs.—S. HARBANS,

KRANEVELD, F. C., & MANSJOER, M. (1947.) Surra bij varkens. **[Surra in pigs.]**—*Ned.-Ind. Bl. Diergeneesk.* **54.** 254–261. [Abst. from English summary.] **2420**

Three pigs, one with severe and two with slight symptoms, proved to be infected with a trypanosome which resembled *Trypanosoma evansi* in respect of its pathogenicity for various species of animals and its morphology.

Naganol [suramin] in 2 g. doses given intravenously as a 10% solution effected a rapid cure and was well tolerated by pigs weighing 150, 110 and 100 kg. respectively.—E. G.

LAUNOY, L. (1948.) Prophylaxie chimique par voie orale, chez le rat, de l'infection expérimentale a *Trypanosoma gambiense* (souche Yaounde). **[Orally administered chemical prophylaxis of experimental *Trypanosoma gambiense* (Yaounde strain) infection in the rat.]**—*Bull. Soc. Path. exot.* **41.** 464–470. **2421**

Diamidinodiphenoxypentane in the form of 2,2′-methylene-bis-oxynaphtholate was administered in a gum suspension. Doses from 0·15–0·3 g. per 100 g. body weight were given. A few deaths occurred after the injection of 0·3 g., some control rats tolerated 0·4 g. Doses of not less than one million parasites were injected intraperitoneally from 1–27 days after prophylactic treatment. Blood from treated rats was never infective to mice and no parasites were demonstrated. Doses of 0·25 g. per 100 g. body weight were equally effective for intervals up to five days between prophylaxis and treatment.—G. V. L.

HENNING, M. W. (1948.) **Diseases of calves. Coccidiosis (red diarrhoea).**—*Fmg S. Afr.* **23.** 632–640. **2422**

H. gives an account of coccidiosis in calves caused by *Eimeria zurnii*. The generalized coccidial life-cycle, the environmental factors controlling the sporulation of the oocyst, transmission, susceptibility, symptoms, course of the disease, lesions, immunity, and diagnosis are each considered. Prophylactic measures like stable hygiene, disposal of manure, disinfection with ammonia or a mixture of 4 parts of carbon bisulphide and 1 part raw cresol, and treatment receive attention. General treatment aims at prevention of reinfection. Treatment with astringent preparations like tannic acid and wattle-bark extract is described. Sulphonamides given by mouth at the rate of 6 g. per 100 lb. body weight, and sulphanilate given in the form of an enema is also mentioned.—C. HORTON SMITH.

KAR, A. B. (1947.) **Chemical agents for control of rabbit coccidiosis.**—*Curr. Sci.* **16.** 287–288. **2423**

K. conducted trials for destroying the rabbit coccidian oocysts *in vitro* with 14 different chemicals: *e.g.*, carbolic acid 2%, copper sulphate 10%, caustic soda 2%, formol 5%, monochloroxylenol 9% and terpineol 5% [in table 3%], etc., and found that 5% terpineol and 9% monochloroxylenol destroyed 100% oocysts when the latter were suspended for 24 hours in sporulating dishes containing the above two reagents.—S. H.

HAWKING, F., PERRY, W. L. M., & THURSTON, J. P. (1948.) **Tissue forms of a malaria parasite, *Plasmodium cynomolgi*.**—*Lancet.* **254.** 783–789. [Authors' summary copied *verbatim*.] **2424**

The early developmental forms of *Pl. cyno-*

molgi in monkeys—which closely resembles the parasite of benign tertian malaria (*P. vivax*) in man—are described. The announcement by Shortt and Garnham (1948) that these forms occur in the liver is confirmed.

When the sporozoites are injected into monkeys they can be traced for 2–4 hours in the blood and subcutaneous tissues by subinoculation and by microscopy. After that (as is well known) they disappear; and they cannot be detected by subinoculation for 8 days, after which the blood becomes infective again. During this prepatent period the tissue forms are not transmissible by subinoculation even of material (liver) in which they can be demonstrated by the microscope. The passage of the parasites from the tissues into the blood was first detected 7 days 23 hours after the injection of sporozoites into the animal, and it seems to continue asynchronously for several days.

Plasmodial masses similar to those reported by Shortt and Garnham were found in material removed from the livers of monkeys 5 days, 7 days 15 hours, and 7 days 23 hours after the injection of sporozoites. These masses represent stages in the early development of the parasite. By the end of the 7th day they may measure on the average 46 × 30μ. They lie inside hepatic parenchymatous cells, which become greatly distended by the growth of the parasites. One form which appeared to be a parasite was discovered in the brain after intracerebral injection of sporozoites. The histological appearance of the parasites is described and illustrated.

Seaton, D. R., & Lourie, E. M. (1949.) **Acquired resistance to proguanil (paludrine) in *Plasmodium vivax*.**—*Lancet.* **256.** 394–395. [Authors' summary copied *verbatim*.] **2425**

Resistance to proguanil was produced in a strain of *Plasmodium vivax* by giving small doses of the drug to consecutive patients in a series in whom the strain was being maintained by blood-inoculation. The resistance was unaffected by passage through mosquitoes.

Though the resistance acquired was more than eighty times greater than normal, it was only within the last few weeks of the investigation that the strain became resistant to doses within the ordinary therapeutic range.

The fact that this degree of resistance did not arise at an earlier stage, though conditions were specially designed to favour its development and were continued for more than 20 months, indicates that the danger of producing a serious degree of resistance in a strain of *P. vivax* by the ordinary use of proguanil in clinical practice is very slight, if not negligible. This conclusion is reinforced, as regards the suppressive use of proguanil, by the recent finding that resistance in fowl malaria cannot readily be produced by treating latent, as distinct from acute, infections.

Galliard, H., & Cèbe, J. (1949.) Theileriose et piroplasmose chez les buffles splénectomisés au Tonkin. **[Theileriasis and piroplasmosis in splenectomized buffaloes in Tonkin.]**—*Ann. Parasit. hum. comp.* **24.** 5–8. **2426**

In three of four young buffaloes from Tonkin which survived splenectomy *Theileria mutans*, *Babesia bigemina* and *B. bovis* were found in the peripheral blood. *T. mutans* first appeared in the blood on the seventh day after splenectomy and persisted in the blood up to ten months. *B. bigemina* and *B. bovis* appeared at irregular intervals and in smaller numbers. None of these organisms were seen in blood films examined prior to splenectomy. Haematological examinations of the blood were made before and after splenectomy and the results are recorded. [The organisms seen are referred to as *T. mutans*, *B. bigemina* and *B. bovis*, presumably on morphological grounds only. The transmissibility of these buffalo parasites to cattle was not tested. In the absence of such experiments it might have been more correct to describe the organisms as "resembling" *T. mutans*, *B. bigemina* and *B. bovis*. The transmissibility of haematozoa of the buffalo to cattle is of some practical importance and there does not seem to be much information on the subject in the literature. Schein (1921) described *B. bubali* from buffaloes. It resembled *B. bigemina*, but Schein (1923) considered it to be distinct as he failed to infect a buffalo with typical *B. bigemina* from a calf.]—M. C.

See also absts. **2458** and **2459** (trypanosomiasis); **2553** (rumen infusoria).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Schäfer, W. (1946.) Über einen Blockierungseffekt bei der künstlichen Maul- und Klauenseuche-Infektion der Meerschweinchen und seine Beziehungen zur Immunität. **[Interference phenomenon in experimental foot and mouth disease in g. pigs.]**—*Berl. Münch. tierärztl. Wschr.* No. 6. pp. 62–68. **2427**

Experimental intradermal infection of g. pigs with a standard A strain of F & M disease was carried out. They were reinfected 18–24 hours later by intravenous injection of 0·5 ml. of a 10% virus suspension of the B type. The B virus could not be demonstrated in the vesicular lesions and *vice versa*. This process is described as the cellular interference phenomenon. The blocked virus strain was demonstrated in the blood up to

30 hours after reinfection, but not after 48–72 hours. Virus inactivated with formalin did not have the blocking effect.

Although the blocked virus was apparently not present in the vesicles of the lesions, a marked immunity developed. G. pigs reinfected with strain B, 14–21 days after intradermal infection, contracted a milder form of the disease than untreated controls.—E. G.

GROUPÉ, V., & RAKE, G. (1947.) **Studies on the chemotherapy of the pox viruses. I. The effect of commercial penicillin and other selected substances on canary pox virus.**—*J. Immunol.* **57.** 17–29. **2428**

A number of selected active and inactive compounds were tested for activity against the viruses of canary pox, fowl pox and vaccinia by a method in which serial dilutions of the substance under test were mixed with virus and incubated *in vitro* before inoculation into the yolk sac of embryonated eggs. The technique is described in detail. The pox viruses produced a fatal infection in chick embryos most readily when inoculated into the yolk sac rather than directly into the allantoic sac or on to the chorioallantois. Yolk sac inoculation was the most satisfactory method for testing the substances for antiviral activity because of its simplicity and because chemotherapeutic activity could be evaluated readily on the basis of the survival of the embryo as well as on the reduction of the number of lesions developing on the chorioallantois. The viruses of canary pox, fowl pox and vaccinia were completely inhibited *in vitro* by 3,750, 7,500 and 15,000 units of commercial penicillin respectively. 15,000 units of one sample of penicillin inhibited at least 1,000 MLD of canary pox virus. An impurity or impurities present in commercial penicillin rather than the penicillin itself was found to be responsible for the inhibition of canary pox virus, a concentration of 1·54 mg. per ml. of total impurities being required to produce complete inhibition of the virus.

A solution containing 15,000 units of commercial penicillin containing 6·15 mg. per ml. of total impurities still retained its ability completely to inhibit canary pox virus *in vitro* after being heated to 100°C. for 10 min.; a slight loss in antiviral activity was produced when the solution was heated for 30 min. at 56°C. The presence of normal egg yolk produced complete inhibition of the antiviral activity of the penicillin solution. It appeared therefore that the impurity or impurities in commercial penicillin responsible for the antiviral activity against canary pox virus was heat stable and was inhibited by the presence of normal egg yolk. To determine the *in vivo* effect of penicillin 0·5 ml. of a solution containing 50,000 units of commercial penicillin was inoculated into the yolk sac of 60 embryonated eggs and 0·5 ml. of saline into 60 controls, followed by 10 infectious units (ID_{50}) of canary pox virus. The penicillin retarded significantly but not strikingly the death rate of the embryos.—CLIVE BRIGGS.

DAWSON, I. M., & ELFORD, W. J. (1949.) **The investigation of influenza and related viruses in the electron microscope, by a new technique.**—*J. gen. Microbiol.* **3.** 298–311. [Authors' summary copied *verbatim.*] **2429**

Influenza and related viruses were studied by a new method in which virus is adsorbed on the membranes of laked fowl red cells for examination in the electron microscope. The numbers of virus particles adsorbed per unit area of red-cell membrane were estimated from direct counts in micrographs of palladium-shadowed and unshadowed specimens. There was a definite saturation level of adsorption for each strain of virus, the value varying also according to the particular batch of cells and their age after storage at 0°. For subsaturation conditions the number of particles adsorbed was proportional to the concentration of virus and the concentration of cells, and a function both of time of contact and temperature. The relationships were complicated by the fact that elution began before adsorption was complete.

The comparative data for the size and variation of these viruses were obtained from micrographs of preparations directly adsorbed from infective allantoic fluid and thus not subjected to harsh methods of purification. The mean sizes ($m\mu$) found for the dried virus were: influenza A virus, $90 \pm 11{\cdot}5$; influenza B virus, 103 ± 8; fowl-plague virus, 101 ± 16; Newcastle-disease virus, 193 ± 28; and mumps virus, 179 ± 28.

The occurrence of long forms associated with influenza B virus was confirmed and filamentous structures were demonstrated for the first time in preparations of a strain of fowl-plague virus.

WOOLLEY, D. W. (1949.) **Purification of an influenza virus substrate, and demonstration of its competitive antagonism to apple pectin.**—*J. exp. Med.* **89.** 11–22. [Author's summary copied *verbatim.*] **2430**

A substance was demonstrated in erythrocytes which antagonized the inhibiting effect of apple pectin on influenza virus hemagglutination. This substance was purified and found to be a water-soluble material, rather labile, and with some properties which suggested that it contained a polysaccharide. It was destroyed *in vitro* by highly purified preparations of the virus. It occurred in greatest amount in human erythrocytes and to a lesser extent in the red cells of species not susceptible to the virus. It was also found in normal rabbit serum.

Calcium ions were found to be essential to the action of apple pectin in causing inhibition of virus hemagglutination. A second substance was purified from an alkaline extract of erythrocytes, and shown likewise to have an effect antagonistic to that of pectin. However, this latter material was not destroyed by the virus, and seemed to owe its effect to the binding of calcium ions.

SADUSK, J. F., Jr., BASSETT, P. C., & MEDDAUGH, J. S. (1949.) **A comparative study of reactions following inoculation with red cell elution and Sharples centrifuged influenza vaccines.**—*Amer. J. Hyg.* **49.** 148–165. [Authors' summary & conclusions copied *verbatim.*] **2431**

A total of 4,127 individuals of a predominantly clerical industrial population was inoculated subcutaneously with 1·0 ml of either of two types of influenza vaccine. Eight hundred and ninety employees received a red cell eluuion type of vaccine; 3,237 employees received a Sharples centrifuged type of vaccine. The two vaccines were essentially similar in potency and virus content. Analysis of reactions was based upon a questionnaire form completed and returned by 85·7 per cent of the vaccinated groups.

There was no significant difference in reaction rates or severity of reaction between the two groups receiving the different vaccines.

The important variable in reaction rate and severity of reaction was found to be that of sex. The reaction rate in the female group was twice that observed in the male group, while the rate for severity of reaction was 4 times as high in the female population as compared with the male group.

A significantly higher rate of reaction was found in the 15- to 24-year age group as compared with the groups of 25 years of age or over where the reaction rate was constant. This difference was particularly marked in the young female population.

Previous inoculation with influenza vaccine does not predispose to a higher rate of reactions.

While the reaction rate appeared to be significantly reduced in a group vaccinated with the centrifuged vaccine and receiving 4 doses of 0·6 gram of acetylsalicylic acid subsequent to vaccination, this reduction was not observed in the groups receiving eluate vaccine or in the group receiving APC (acetylsalicylic acid, phenacetin, and caffeine) tablets. The reduction may therefore be more apparent than real.

Disclosure of 13 individuals with positive intradermal test for the eluate vaccine (and who were rejected for vaccination) indicates the need for methods to screen out egg-sensitive individuals. Employees giving a history of hay fever or asthma showed no higher reaction rate than the remaining individuals of the vaccinated group.

These reactions should not prove a deterrent to vaccination of industrial populations since they are mild and the degree of absenteeism is low.

GINSBERG, H. S., & HORSFALL, F. L. (1949.) **Concurrent infection with influenza virus and mumps virus or pneumonia virus of mice (PVM) as bearing on the inhibition of virus multiplication by bacterial polysaccharides.**—*J. exp. Med.* **89.** 37–52. [Authors' summary copied *verbatim.*] **2432**

Pre-existing infection with PVM or mumps virus does not prevent multiplication of the virus influenza A or B in the same tissue. Similarly, pre-existing infection with one or another of the influenza viruses does not prevent multiplication of either PVM or mumps virus in the same tissue. The failure of these two groups of viruses to interfere with the multiplication of each other is discussed in relation to the mechanism of inhibition of multiplication of mumps virus and PVM by the capsular polysaccharides of Friedländer bacilli, and the ability of influenza A and influenza B viruses to multiply in the presence of large quantities of these carbohydrates. It is suggested that differences in the requirements of the two groups of viruses for host cell metabolic systems may serve to explain both the lack of interference between them and the differing effect of polysaccharides upon their multiplication.

BECKMAN, C. H. (1948.) **Formaldehyde a blood coagulant** *in vivo.*—*Vet. Med.* **43.** 29–31. **2433**

The routine use is recommended in canine virus encephalitis, anaesthesia, and anaemia of 5 ml. 1% formalin solution (0·4% formaldehyde by volume) added to 20% magnesium sulphate solution as a sedative—given intravenously at the rate of 0·75–1 ml. per lb. body weight up to a total of 30 ml. for large dogs. B. believes that vascular leakage in virus encephalitis is due to lack of thrombin and not to virus damage to the intima. Four case-reports are given.—W. R. B.

STULBERG, C. S., & GREEN, R. G. (1947.) **Susceptibility of the bear to fox encephalitis.**—*Proc. Soc. exp. Biol., N.Y.* **64.** 88–89. **2434**

Since the virus of fox encephalitis, a disease common in the North American silver fox, seems to extend its pathogenic properties in varying degrees to other members of the canine family, the authors were interested in determining the degree of susceptibility in the black bear (*Euarctos americanus*), which is an offshoot of the canines.

Intra-ocular inoculation of this virus provides an easy and direct method of assessing this susceptibility: apart from acute systemic infection and encephalitis in highly susceptible animals, it pro-

duces in the less susceptible ones more or less complete opacity in the cornea of the inoculated eye.

When two black bears were given varying dilutions of the virus (preserved as a 20% suspension of fox brain) intra-ocularly, they exhibited varying but slight signs of susceptibility. A third bear failed to develop observable symptoms when inoculated intramuscularly. The authors conclude that: "the pathogenic properties of fox encephalitis virus derived from foxes seem sharply confined to the canine family."—G. P. MARSHALL.

PALMEIRO, J. M. (1946.) Peste equina em Cabo Verde. [**A virus disease of horses in the Cape Verde Islands.**]—*Rev. Med. vet., Lisboa.* **41.** 209–218. [English & French summaries.] **2435**

A serious epizootic disease of solipeds occurs in the Cape Verde Islands. It was first seen in 1918, a year after its probable introduction into the country by Senegalese horses. Since that time there have been three major recrudescences, the last being in 1944.

The disease is aestival in incidence and is apparently carried by biting flies. It is transmissible to dogs, g. pigs and mice, by the intracerebral and subdural inoculation of filtered material. From his study of the symptoms and lesions of the natural and artificial infections P. believes that the disease is African Horse Sickness. —I. W. JENNINGS.

ANON. (1949.) **ECA veterinarian enroute to Formosa with vaccine as many agencies join with FAO to fight new outbreak of rinderpest.** —*Washington, D.C.: FAO.* Press Release. [Mimeographed.] **2436**

Introduction of rinderpest into Formosa by a cargo of pigs from Hainan Island in October 1949 is reported. Formosa is said to have been free from rinderpest for some years. A veterinary officer is being sent from Washington to inaugurate a vaccination campaign using virus obtained from Bangkok; the vaccine virus will be kept in a refrigerator at the Hong Kong Dairy Farm pending the arrival of the veterinary officer. Rabbits are to be used to produce vaccine. [Presumably the Japanese rabbit-adapted virus is to be used, although this is not stated.]—M. C.

BAKER, J. A., & LITTLE, R. B. (1946.) **A virus causing abnormal milk in cattle.**—*Proc. Soc. exp. Biol., N.Y.* **63.** 406–407. **2437**

A number of cows showing thick milk with blood were suspected of being infected with a virus. G. pigs inoculated intraperitoneally with 1 or 5 ml. of the affected milk developed 4–7 days later a pyrexia which lasted for three days. Blood from these g. pigs was inoculated into rabbits intravenously and into mice intraperitoneally causing a thermal reaction in the former.

Inoculation of the chorioallantoic membrane of 10-day incubated eggs with g. pig blood caused no pathological lesions. Lactating cows inoculated subcutaneously with 1 ml. of g. pig blood developed fever and alterations in the milk. The authors state that neutralizing antibodies were produced and conclude that from the evidence shown the agent must be a virus. [See also *V.B.* **17.** 350.]—J. I. TAYLOR.

HART, L., HAYSTON, J. T., & KEAST, J. C. (1949.) **Observations on contagious pustular dermatitis of sheep.**—*Aust. vet. J.* **25.** 40–45. [Authors' summary copied *verbatim.*] **2438**

An account is given of experiences with contagious pustular dermatitis of sheep as it occurs in New South Wales. A standard procedure for the diagnosis of the disease is described. The virus has been successfully passed through collodion membranes, A.P.D. 700$\mu\mu$, but failed to grow on developing eggs. The virus has been shown to survive at room temperature for over 15 years. The methods of preparation and application of a vaccine and the satisfactory results of the vaccination of over 50,000 sheep are described. Immunological aspects of the disease are discussed.

SÜSS, K. (1939.) Eigene Beobachtungen über die Schweinelähme (Encephalomyelitis enzootica suum). [**Porcine encephalomyelitis.**]—*Wien. tierärztl. Mschr.* **26.** 641–648. **2439**

S. describes in detail the symptoms of Teschen disease observed in Linz during an outbreak in the summer of 1938. The methods of differential diagnosis and protective vaccination are discussed.—MARJORIE LATZKE.

GREEN, R. G. (1947.) **Use of distemperoid virus in the treatment of canine distemper.**—*Vet. Med.* **42.** 329–330. **2440**

This is a general talk by G. on the use of the "distemperoid" (ferret-adapted) virus as a curative agent in dogs. This strain of virus is highly virulent for the ferret and the mink; it causes mild disease in bears and racoons, subclinical disease in dogs, wolves and coyotes and produces no observable reaction in foxes.

A peculiarity of the virus is that the smaller the dose, the greater is the reaction. With a large dose the reaction is less marked. There is no explanation of this peculiarity.

In using the virus therapeutically in dogs the minimum dose should be 1 mg. of dry spleen tissue per lb. body weight.—M. C.

GLENNEY, W. C. (1947.) **Seven years of field research with distemperoid virus (Green Method)** —*N. Amer. Vet.* **28.** 366–369. **2441**

The results obtained in approximately one

thousand cases are reported. Doses varying from 2·5–25 mg. or more have been used. No fatal reactions have occurred; the more severe reactions have occurred with the smaller doses. Eight-week-old puppies have been immunized with safety.

Care must be taken to ensure that dogs to be immunized are in good condition; they must not be heavily infested with parasites. Bitches in oestrus or pseudo-pregnancy should not be immunized. For therapeutic use large doses are essential (1–2 mg. per lb. body weight) and must be given in the early stages of the disease before secondary infections have occurred. For immunizing racing greyhounds a dose of 25–50 mg. is administered at about five or six months of age and a second dose about 30 days before they go to the race track. If a severe reaction occurs after the initial dose of vaccine it is controlled by giving a second dose. To avoid abscess formation at the site of injection care must be taken in diluting and suspending the dried vaccine before injection. —M. C.

I & II. Kennedy, A. H. (1949.) **Studies on neutropic distemper of foxes. IX. Blood examinations of foxes that showed no symptoms of, and no blood deviations that would indicate, neurotropic distemper infection. X. Therapeutic agents used on foxes during an enzootic of neurotropic distemper.**—*Canad. J. comp. Med.* **13.** 67–70; & 97–102. [For parts I–VII see *V.B.* **19.** 153–4. Part VIII in press.] **2442**

I. Blood changes, described as being characteristic of neurotropic distemper, did not occur in foxes exposed to the disease but without manifest symptoms.

II. Therapeutic agents used in the study included sodium penicillin, anti-bacterial serum, homologous anti-canine distemper serum, sulphadiazine and formol tissue vaccine prepared from spleen and lung tissues of foxes dead from distemper. Anti-canine distemper serum and sulphadiazine appeared to be of some value in affected foxes which did not manifest convulsions. Sulphaguanidine was effective in the control of associated diarrhoea. No agent tried was of value for treatment or control of neurotropic distemper once convulsions occurred.—P. J. G. Plummer.

Ginsberg, H. S., Goebel, W. F., & Horsfall, F. L., Jr. (1948.) **The inhibitory effect of polysaccharide on mumps virus multiplication.** —*J. exp. Med.* **87.** 385–410. [Authors' summary copied *verbatim*.] **2443**

Polysaccharides derived from type-specific Friedlander bacilli cause inhibition of the multiplication of mumps virus in the allantoic sac of the chick embryo. As little as 5 μg. of polysaccharide is effective as an inhibitor. Inhibition of multiplication is obtained when polysaccharide is injected as long as 4 days after inoculation of virus. Chemical studies have shown that the structural configurations of the polysaccharide responsible for specific serological activity are not identical with those which determine the inhibitory effect relative to mumps virus. The possible mechanisms of the inhibition of viral multiplication by means of polysaccharides are discussed.

Ginsberg, H. S., Goebel, W. F., & Horsfall, F. L., Jr. (1948.) **The effect of polysaccharides on the reaction between erythrocytes and viruses with particular reference to mumps virus.**—*J. exp. Med.* **87.** 411–424. **2444**

Polysaccharides which cause inhibition of the multiplication of mumps virus in the allantoic sac may or may not cause inhibition of hemagglutination by the virus. Moreover, such substances may or may not prevent adsorption of the virus by erythrocytes. The available evidence indicates that polysaccharides active as inhibitors do not block adsorption of mumps virus by cells of the living allantoic membrane. With influenza A, influenza B and Newcastle disease viruses, as well as with PVM, there also appears to be a lack of correlation between the *in vitro* and *in vivo* inhibiting activity of polysaccharides.

Diaz-Rivera, R. S., Acosta, C. G., Collazo, P. J., & Lebron, A. P. (1949.) **Effect of para-aminobenzoic acid on murine typhus. A clinical study of 60 cases.**—*Amer. J. med. Sci.* **217.** 13–20. [Authors' summary copied *verbatim*.] **2445**

Thirty-three patients suffering from murine typhus were given heavy doses of para-aminobenzoic acid for variable intervals and at different stages of the disease, the clinical course being compared with that of 27 untreated cases. An analysis of the data gathered in the course of this study tends to demonstrate: Patients with endemic typhus can tolerate large doses of para-aminobenzoic acid as long as 9 days, and in total amounts as high as 219 gm. without toxic manifestations. The duration of the disease is considerably shortened by the administration of the drug, especially when therapy is started within the first week of onset of the disease. The severity of the symptoms of murine typhus is modified within the first 24 to 48 hours after the initiation of treatment. The drug probably fails to alter the fundamental pathologic process, but aids in the abatement of the toxic manifestations, and, perhaps indirectly, controls the growth and multiplication of the rickettsiae. The drug does not seem to affect the immunological response of the body to infection with the rickettsiae of murine typhus.

It can be concluded that heavy doses of para-aminobenzoic acid are safe and beneficial in the management of murine typhus, especially when treatment is started early in the course of the disease.

SFORZA, M. (1947.) Dermotifo in Eritrea (Identificazione dei virus storico, murino e da zecche). **[Tick-borne typhus in Eritrea. (Dogs as reservoirs.)]**—*Bol. Soc. ital. Med. ig trop. sez., Eritrea. Asmara.* **7.** 430–463. **2446**

Tick-borne typhus in man was studied in Eritrea and the virus was isolated from man, from ticks and from the cerebellum of a dog. The classic (louse-borne) strain, the murine strain and the tick-borne strain were studied.

Eight specimens of *Rhipicephalus sanguineus* were found on a stray dog which had given positive agglutination reactions with Proteus OX19 (1 : 320), OX2 (1 : 80) and OXK (1 : 80). The ticks were triturated, mixed with 4 ml. of physiological saline, filtrated and inoculated peritoneally into two g. pigs. Four g. of brain tissue from the dog were mixed with 10 ml. of physiological saline and two more g. pigs inoculated intraperitoneally. Both pairs reacted 4–5 days after inoculation.

The virulence of the virus was lost after the fourth passage.—E. G.

SHEPARD, C. C. (1948.) **Q fever : a serological survey of bovine serums in the United States.**—*Amer. J. trop. Med.* **28.** 849–855. [Author's summary copied *verbatim.*] **2447**

Over 1700 serums from cattle in 37 states have been tested in the complement fixation test for Q fever. Twenty-seven positive serums were found from dairy cows in 10 states and from beef cattle in 5 states. The positive serums with two exceptions came from cows in the western two-thirds of the country.

Work done on bovine serums with an agglutination test employing *R. burneti* as antigen is reported briefly. Although many positive reactions were seen, it was thought likely that the reactions were caused by the so-called " natural " agglutinins.

The results of the survey of bovine serums by complement fixation suggest that human cases of Q fever should be sought especially in parts of the country from which cases have not so far been reported.

ANDREWES, C. H., & HORSTMANN, D. M. (1949.) **The susceptibility of viruses to ethyl ether.**—*J. gen. Microbiol.* **3.** 290–297. [Authors' summary copied *verbatim.*] **2448**

We have examined by a uniform technique the sensitivity of twenty-five viruses to ethyl ether. Evidence of the sensitivity of ten other viruses is available from the literature. Viruses seem to be either very sensitive or highly resistant. Of the viruses pathogenic to animals, most of the resistant ones are either in the pox group or amongst the very small viruses. The results may prove of use to workers who at times need to separate one virus from mixture with others or with bacteria. The findings may also be of value in any attempt at virus classification.

See also absts. **2527** (bacteriophage) ; **2577** (influenza) ; **2608** (cell inclusions).

IMMUNITY

ZIA, S. H. (1948.) **Toxicity of equine serum treated by alkali.**—*Proc. Soc. exp. Biol., N.Y.* **67.** 189–190. **2449**

It is known that the antigenicity of proteins can be removed by treatment with alkali. Alkali-treated bovine serum has been found to be toxic for g. pigs. Z. studied the toxicity of horse serum after treatment with alkali and found that it was practically non-antigenic, but definitely toxic for g. pigs. It was not toxic for rabbits and white mice. The nature of the toxic substance is to be investigated.—M. C.

See also absts. **2378-2381** (TB.) ; **2397** (brucellosis) ; **2427** (interference phenomenon) ; **2431** (haemagglutination) ; **2441** (distemper).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

WARREN, D. C., EATON, R., & SMITH, H. (1948.) **Influence of infestations of body lice on egg production in the hen.**—*Poult. Sci.* **27.** 641–642. **2450**

Egg production was recorded, before and after treatment with sodium fluoride, in groups of laying hens, rated as having no lice, slight infestation, moderate infestation and heavy infestation. The results indicate that the degree of infestation did not affect production.—D. LUKE.

GUILHON, J. (1946.) Propriétés insecticides des isomères de l'hexachlorocyclohexane. **[The insecticidal properties of isomers of benzene hexachloride.]**—*C.R. Acad. Agric. Fr.* **32.** 754–760. [Abst. from abst. in *Rev. appl. Ent.* Ser. B. **37.** 33] **2451**

The results are given of laboratory tests in France which show that while the γ isomer of BHC (benzene hexachloride) is the most toxic of the four known isomers to many insects, the other three also possess insecticidal properties.

When examples of *Trichodectes canis*, Deg.,

were left at a temperature of 30–35°C. in contact with the four isomers and with a sample of technical BHC that had shown superior toxicity, the mortality percentages after eight hours were 54 for the α isomer, 23·3 for the β isomer, and 92·6 for the γ isomer and 75·4 for the δ isomer, as compared with 100 for the technical BHC and 20 in the controls. Individuals that were exposed to the technical BHC appeared completely paralysed in one hour, whereas those in contact with the γ isomer were still active. In tests in which the insects were confined on paper on which a little of the γ isomer had been sprinkled until they were paralysed and were then removed, adults of *Musca domestica*, L., *Calliphora vomitoria*, L., and *Sarcophaga carnaria*, L., were all completely paralysed in 13–35 minutes; the time required for mortality was not observed for *Sarcophaga*, but was 75 minutes for *Calliphora* and ranged from $3\frac{1}{2}$ to $16\frac{1}{2}$ hours for different batches of *Musca*. In a further test, in which a very small quantity of sugared water containing a minute particle of the γ isomer was placed on the lower surface of the end of the proboscis of an active and apparently healthy individual of *M. domestica*, total paralysis ensued in 13 minutes and death in 323 minutes.

To test the fumigant effect, adults of *M. domestica* were kept under glass jars in which an open tube containing one of the isomers had been placed. The average times in which complete paralysis ensued were 140, 108, 57 and 80 minutes for the α, β, γ and δ isomers, respectively, whereas most of the controls were unaffected after 30 hours.

The superiority of technical BHC over the γ isomer in the earlier tests suggests that it may have contained either some unidentified isomers of still greater toxicity or one or more other toxic substances.

Saccà, G. (1947.) Sull'esistenza di mosche domestiche resistenti al DDT. [**On the existence of house flies resistant to DDT.**]—*Riv. Parassit.* **8.** 127–128. [English summary.] [Abst. in *Bull. Hyg., Lond.* **23.** 49–50. (1948), copied *verbatim*. Signed: J. R. Busvine.] **2452**

At the end of May, 1947, a programme of house-spraying with 5 per cent. DDT in kerosene was in progress. In the course of inspection in one locality, a number of houseflies (*Musca domestica*) were observed resting in the treated rooms. This was contrary to previous experience. It was supposed that the houses had been badly treated, and spraying was repeated, but a few days later the flies were present in the same numbers.

Similar resistant flies were observed in another locality. They were found in rooms treated with four times the dose usually fatal to flies. These strains of flies were taken to the laboratory and kept in culture. It was demonstrated that they had an abnormal resistance, and the name *Musca domestica* var. *tiberina* is proposed for the "race". [No details are given of the "demonstration" in the laboratory.]

Shanahan, G. J., & Morley, F. (1947.) **B.H.C. (Benzene hexachloride) as a blowfly dressing.**—*Agric. Gaz. N.S.W.* **58.** 660 and 672. **2453**

An emulsion of xylol 2% and benzene hexachloride 1% freed sheep from blowfly maggots and prevented re-strike. The preparation did not, however, give a satisfactory kill of old maggots which escape from treated strikes. —H. McL. Gordon.

Gómez, L. (1946.) Revisión crítica de los casos de oftalmomiasis españolas. [**A critical revision of the cases of ocular myiasis in Spain.**]—*Rev. ib. Parasit.* **6.** 51–73. [Abst. in *Rev. appl. Ent.* Ser. B. **36.** 119. (1948), copied *verbatim*.] **2454**

In view of a case of ocular myiasis due to *Oestrus ovis*, L., in man in Granada in 1945, the author gives a list of about a dozen such cases that have been recorded in Spain since 1918. The identity of the larvae concerned is not certain in every one, but *O. ovis* appears to be the fly most frequently responsible, though it has sometimes been misidentified; only one case was certainly due to *Rhinoestrus purpureus*, Brauer. The first-instar larvae of these two flies, which have sometimes been confused, are described, that of *R. purpureus* from the work of Portchinsky, and characters are given distinguishing them. The larvae of *O. ovis* observed in Granada and those described by Coulon & Dinulescu from Corsica are considered to represent different varieties, which are distinguished by the form of the spiracles as vars. *granutae* and *corsicae*, n.

Bouvier, G. (1947.) Sur les myiase des mammifères de la Suisse. [**Myiasis of mammals in Switzerland.**]—*Mitt. schweiz. ent. Ges.* **20.** 291–303. [Abst. in *Rev. appl. Ent.* Ser. B. **36.** 155. (1948), copied *verbatim*.] **2455**

This paper contains information on the 12 species of oestrids in seven genera that occur or are likely to occur in Switzerland. Keys to the larvae are given for the genera, and for the four species of *Gasterophilus* and the three of *Hypoderma* and to the pupae for the species of *Gasterophilus*, followed by records of the distribution of the 12 species and notes on the bionomics of some of them. Two methods of preserving the larvae are briefly described.

Unsworth, K., Edwards, H., & Bertram, D. S. (1947.) **Failure to control *Hypoderma* by the spraying of oviposition sites on cattle with**

'Gammexane'.—*Ann. trop. Med. Parasit.* **41.** 262–265. **2456**

An emulsion containing 3 g. gammexane in 60 ml. oil made up to 3,000 ml. with water per cow applied to *Hypoderma* oviposition sites at weekly intervals did not control the warble infestation.—G. B. S. HEATH.

BRUES, C. T. (1947.) **Dragonflies as predatory enemies of the stable-fly** (*Stomoxys calcitrans*). —*Psyche.* **53.** 50–51. [Abst. in *Rev. appl. Ent.* Ser. B. **37.** 35. (1949), copied *verbatim.*] **2457**

Accounts have recently been published of dragonflies commonly destroying *Stomoxys calcitrans*, L., on the Gulf coast of Florida. The author here records that the fly was very numerous and troublesome at a camp on the shores of Cedar Lake in northern Manitoba in the evening of 5th July 1936 and was even more abundant early in the next evening, but disappeared in a few minutes following the appearance of great numbers of dragonflies during the long twilight. It did not reappear during the remaining weeks of the author's stay at the camp, but numerous dragonflies were seen feeding in the air overhead each evening.

MOGGRIDGE, J. Y. (1948.) **Night activity of tsetse** (*Glossina*) **on the Kenya Coast.**—*Proc. roy. Ent. Soc.* Ser. A. **23.** 87–92. [Abst. in *Trop. Dis. Bull.* **46.** 337. (1949), copied *verbatim.* Signed: P. A. BUXTON.] **2458**

The author has made observations on the adult of *Glossina austeni*, a species which is normally regarded as seldom biting man. He finds that on the Kenya Coast, and especially in the dry season, this insect bites man readily at night. Considerable numbers were caught by a party moving along a path in the bush after midnight carrying no lights. As the insects bite irrespective of the state of the moon and are prepared to do so on a very dark night, the view that their sense of smell is important in finding a host is to some extent strengthened. As soon as day breaks, the attack of these insects on man ceases, except that in very dry weather there is a period of "rush activity": they then attack man fiercely for a brief period in the very early morning.

SUTER, H. E. (1948.) Rapport sur un essai concernant l'application d'une émulsion de D.D.T. dans la lutte contre la tsé-tsé. **[A trial of DDT for control of tsetse fly.]**—*Bull. Agric. Congo belge.* **39.** 415–426. **2459**

It was found possible to exterminate the tsetse fly population in a limited area by dipping the cattle twice a week during the rainy season and once a week during the dry season with 3% D.D.T. solution, provided that there was no large-scale immigration of flies from nearby woods. The clearing of woods and elimination of game was an important factor.

In small-scale spraying of cattle trials against *Glossina fusca* and *Glossina palpalis* D.D.T. was more effective than gammexane, 1% D.D.T. being effective for eight days and 0·4% for five days.

—BERYL A. THURSTON.

VAĬNBERG & KRASIL'SCHIKOV. (1946.) **[Results of the use of phenothiazine as a larvicide.]** —*Med. Parasitol., Moscow.* **15.** 75–77. [In Russian.] [Abst. in *Rev. appl. Ent.* Ser. B. **36.** 81–82. (1948), copied *verbatim.*] **2460**

In field tests in Bessarabia in 1946, dusts containing phenothiazine (thiodiphenylamine) gave complete mortality of anopheline larvae of all instars in 12 hours and proved a good substitute for Paris green. It was found that a rate of 0·45–0·9 lb. phenothiazine per acre, according to the density of the vegetation, was sufficient when applications were made from an aeroplane and 0·9–1·35 lb. when they were made from the ground. Ash, road dust and talc all proved good diluents, and effective dilutions were 1:1 for applications from the air, 1:19 for hand-dusting apparatus and 1:100 for broadcasting by hand. No injury to vegetation and no instances of the poisoning of cattle, of fish in ponds that were treated repeatedly, or of bees within the dusted areas were observed. Slight irritation of the skin and eyes was experienced by the operators, though the mouth and nose were protected by muslin and the eyes by goggles, but it disappeared in 2–3 days.

Drawbacks to the use of phenothiazine were the formation of lumps in the packed material and the increased cost of dusting from an aeroplane as compared with Paris green, which is less bulky. Owing to its low specific gravity, phenothiazine always floats on the water; it cannot mix with it in the form of a suspension and so is ineffective against larvae of *Culex* and *Aëdes*. Symptoms of poisoning were observed in a goat, a calf, a cat and a dog after 0·5 and 3 gm. phenothiazine had been added to their food, on two successive days, and severe symptoms when 15 gm. was subsequently administered to a cat and a dog, but all eventually recovered.

GEURDEN, L. M. G. (1946.) Vergelijkend onderzoek over de werking van D.D.T. en gelijkaardige production op de duiventeek (*Argas reflexus*). **[Comparative test of the effect of DDT and similar products on the pigeon tick** (*A. reflexus*)**.]**—*Rep. 1st int. Congr. Plant Prot. Heverlee.* pp. 316–318. [Abst. in *Rev. appl. Ent. Ser.* B. **36.** 152. (1948), copied *verbatim.*] **2461**

In a laboratory test in Belgium, engorged

adults of *Argas reflexus*, F., were placed separately in glass tubes in direct contact with very small quantities of various dusts and examined microscopically every 24 hours. The periods required for mortality (of five ticks) averaged 340·8 hours for 10 per cent. DDT, 470·0 hours for 10 per cent. benzene hexachloride, 732·0 and 388·8 hours for benzene hexachloride treated with chlorine and nitric acid, respectively, and 264·0 hours for a dust containing 4 per cent. DDT and 0·1 per cent. γ benzene hexachloride with no mortality in the controls.

BRAUN, W., & SCHUERMANN, H. (1947.) Die Wirkung des Gesarol (Dichlordiphenyltrichlormethylmethan = "DDT") auf den Acarus scabiei bzw. auf die menschliche Krätze. [**The action of DDT on *Sarcoptes scabiei* and human scabies.**]—*Med. Klinik.* **42.** 319–322. [Abst. in *Bull. Hyg., Lond.* **24.** 60. (1949), copied *verbatim*. Signed: R. M. GORDON.] **2462**

The authors first observed the effect of DDT on *Sarcoptes scabiei in vitro* and noted its slow lethal effect, most of the mites dying 12–15 hours after immersion. They then applied four per cent. DDT in Ethoxyethyleneglycol over the burrows of mites in the skin of patients. Samples of the mite population were removed at intervals of five hours up to 40 hours, and their survival time after removal was recorded; as a control, mites were removed, and similarly observed, from scabies patients treated with a base containing no DDT. The authors noted that in addition to mites which could be classified as living or dead, there was a third class, "*agonale Milben*" which, although moribund, were, nevertheless, slow to die, and they therefore undertook a third series of experiments, similar to those just described, but in which the mites were examined more frequently. As a result of these experiments, it was found that some of these moribund mites survived for as long as 24 hours, but all the mites had perished at the end of 28 hours. The results of all these experiments are set out in considerable detail in tables and graphs, which do not lend themselves to summarization. Finally, the authors infected themselves with scabies, the resultant infection being treated with four per cent. DDT, and some of the mites removed two hours after its application. A number of these mites were alive and survived for as long as 51 hours after removal, a finding which contradicts a previous author's (Schonfeld) statement that DDT is a quickly acting sarcopticide which kills mites within one hour of its application. As a result of their observations, the authors came to the conclusion that the value of DDT as a sarcopticide is limited by the fact that it only acts as a contact insecticide, and, as might be expected from previous experiences of the effects of DDT on other arthropods, it acts very slowly. The authors point out that this slow action may, under certain circumstances, have its advantages, and result in the drug being less irritating than would be the case if it was quickly absorbed; thus among 15 patients treated and cured with DDT, only three showed some dermatitis, which yielded readily to treatment. Although slow, its action is very certain, and all the mites removed from the skin were found to be dead 40 hours after a single application; nevertheless, to be on the safe side, the authors recommend two treatments and point out that a rapid cure with four per cent. DDT cannot be expected.

In spite of these points in its favour, the authors consider that DDT is not to be preferred to other well-known sarcopticides, such as benzyl benzoate.

BISHOPP, F. C. (1948.) **Large scale insect control problems.**—*Soap & Sanit. Chem.* **24.** 143–145; 169 & 171. **2463**

The many demonstrations in recent years of the effectiveness of the control of insects that attack man, livestock, crops and forests have made the public insect conscious and are causing it to demand higher standards of insect control. The livestock spraying operations which have become very extensive in the U.S.A. must still be regarded as experimental. However, the general adoption of these operations will depend upon the demonstration of their effectiveness and timeliness as well as on their economy. Each individual in a community must be thoroughly convinced of the need for such work and the broader benefits to be derived from it so that an effective follow-up may be continued.

While the newer insecticides have aided the large-scale control programmes, many new problems have arisen; such as the development of insects resistant to insecticides and the destruction of the natural enemies of some pests allowing them to multiply unchecked.

As a residual insecticide D.D.T. continues to be outstanding. For application to buildings for control of flies, mosquitoes, sand flies and a number of other pests it will doubtless continue to be a favourite. The widespread reports of the failure of D.D.T. to control flies effectively as compared with highly satisfactory results in previous years are worthy of serious consideration. These reports were confirmed at the Orlando, Florida, station where in the course of a number of generations a strain of flies was developed which was resistant not only to D.D.T. but to other insecticides. Under natural conditions these resistant strains may evolve through the use of poor formulations, improper application, neglect of

sanitation or a combination of these and other factors.—W. MOORE.

BROWNING, H. C., FRASER, F. C., SHAPIRO, S. K., GLICKMAN, I., & DUBRÛLE, M. (1948.) **The biological activity of DDT and related compounds.**—*Canad. J. Res.* Sect. D. **26.** 282–300. **2464**

A study evolving 68 compounds, the graphic formulae being given, was made on D.D.T. and related compounds using halogen analogues, reduced compounds, carbinols and their esters, ethanones, diphenylamines and the γ-isomer of benzene hexachloride for insecticidal activity against *Drosophila melanogaster*. The fluorine analogues and carbinol esters were especially effective. Some compounds were also examined for mammalian toxicity, but no relation was established between insecticidal potency and mammalian toxicity. [Phenothiazine or thiodiphenylamine is not one of the diphenylamines included in this study.]

Fat soluble and toxic properties were not found to be associated with particular parts of the molecule, but the essentials of an active molecular structure are a two-carbon chain with one para-substituted phenyl ring on carbon one and a di- or tri-halogen group on a saturated carbon two. The arrangement of atoms within the molecule is also of importance.—J. F. A. SPRENT.

BROWNING, H. C., SHAPIRO, S. K., & DUBRÛLE, M. (1948.) **The insecticidal activity of DDT and related compounds against different insect species.**—*Canad. J. Res.* Sect. D. **26.** 301–306. **2465**

Six compounds :– D.D.T. ; fluoro-D.D.T. ; acetoxy - carbinol - D.D.T. ; carbinol - D.D.T. ; methyl-D.D.T. and monochlor-D.D.T., the synonyms and graphic formulae being given, were tested for insecticidal activity against the beetles, *Calandra granaria* and *Tribolium confusum*, the moth *Ephestia kuhniella*, the cockroach *Blatella germanica* and a plant parasite *Oncopeltus fasciatus*. Percentage kills were given in a table. Fluoro-D.D.T. was especially effective against the cockroach and carbinol-D.D.T. against the plant parasite. Comparisons were made with the results of the earlier tests against *Drosophila* and potencies of the five compounds against different insect species relative to D.D.T. were tabulated.

—J. F. A. SPRENT.

See also absts. **2446** (ticks) ; **2529** (insecticin).

PARASITES IN RELATION TO DISEASES [HELMINTHS]

VAN GREMBERGEN, G. (1945.) Over Strongyloides bij het varken. [*Strongyloides* **in young pigs.**]—*Vlaam. Diergeneesk. Tijdschr.* **14.** 45–55. [English, French & German summaries. Abstract from summaries.] **2466**

The author found *Strongyloides* worms, probably of the species *ransomi*, in the small intestine of a four-month-old cachectic pig.

He points out that most authors consider that these worms are not pathogenic, but he is of the opinion that the adult forms may cause serious disturbance to health and the larvae may cause skin lesions.—E. G.

CARLO, R. (1947.) Due elminti del genere cylindropharynx parassiti dell'asino e del mulo. —Nuove specie. [**Two new species of helminth parasites of the** *Cylindropharynx* **genus found in mules and donkeys.**]—*Clin. vet., Milano.* **70.** 170–175. **2467**

C. discovered in the colon of donkeys and occasionally in mules in Addis Ababa two species of nematodes of the genus *Cylindropharynx*, worms of this genus so far having been known only in the zebra. Anatomical details are given and compared with those of *C. brevicauda* and *C. longicauda*. The author believes there is sufficient difference to classify the worms as new species, and suggests, therefore, that they be named *C. aethiopica* and *C. asini*.—I. W. JENNINGS.

GORDON, H. McL. (1948.) **The anthelmintic efficiency of phenothiazine sulphoxide against** *Oesophagostomum columbianum* **in sheep.**—*Aust. vet. J.* **24.** 335–336. **2468**

Phenothiazine sulphoxide, at a dose rate similar to that used for phenothiazine itself, 20 g. *per os*, was equally effective against *O. columbianum* when tested in two sheep. The worms were passed somewhat more rapidly than is usual after administration of phenothiazine, suggesting greater efficiency or perhaps a more rapid action due to the greater solubility of the sulphoxide (30 p.p.m. compared with 1 p.p.m.). However, when smaller doses, 5 and 10 g., were tested, anthelmintic efficiency was not greater than that which would have been expected from similar doses of phenothiazine itself.

The sulphoxide appears to be the first derivative of phenothiazine to show the high degree of anthelmintic efficiency and low toxicity characteristic of the parent compound. [See WHITTEN, L. K. *V. B.* **19.** 352.]

DE BRITO GUTTERRES, J. (1946.) Un nouveau nématode parasite du duodenum du mouton. [**A new nematode parasite of the duodenum of the sheep.**]—*Rev. Med. vet., Lisboa.* **41.** 431–435. [In French.] **2469**

While working at the Kansénia Mission in the Belgian Congo the author studied the parasite

to which he gives the name *Gaigeria ullissiponensis*, n.sp. He describes the adult forms and differentiates them from *G. paschycelis*.—F. A. Esteves.

Leitão, S. (1946.) Protostrongilose bronchopulmonar dos ovinos e caprinos portugeses. **[Lungworms in sheep and goats in Portugal.]** —*Rev. Med. vet., Lisboa.* **41.** 200–208. [English and French summaries.] **2470**

A general account of the subject. *Dictyocaulus filaria*, *Protostrongylus rufescens* and *Muellerius capillaris* are the worms found in sheep and goats.—F. A. Esteves.

Metianu, T. (1949.) Consiserations sur la parafilariose hémorragique des bovins. *Parafilaria bovicola* en Roumanie. **[Haemorrhagic dermatitis in cattle in Roumania caused by** *Parafilaria bovicola*.**]**—*Ann. Parasit. hum. comp.* **24.** 54–59. **2471**

M. studied a haemorrhagic dermatitis of cattle in Roumania which occurred in several widely separated areas. The ten cases studied were all in adult cattle. The animals were in good condition and had normal temperatures. Nodules about the size of a hazel nut were present on the skin. Soon after the first appearance of a nodule there was haemorrhage from its summit leaving a smear of clotted blood on the hair beneath the nodule. At the time of bleeding the head end of a nematode could be seen in a circular orifice at the summit of the nodule. The nematode was identified as *Parafilaria bovicola*, first described by Tubangui (1934) in the Philippines. The characters of the worm and of its eggs are described.—M. C.

Harned, B. K., Cunningham, R. W., Halliday, S., Vessey, R. E., Yuda, N. N., Clark, M. C., Hine, C. H., Cosgrove, R., & SubbaRow, Y. (1948.) **Studies on the chemotherapy of filariasis. VI. Some pharmacodynamic properties of 1-diethylcarbamyl-4-methylpiperazine hydrochloride, hetrazan.**—*J. Lab. clin. Med.* **33.** 216–235. [Authors' summary and conclusions copied *verbatim*.] **2472**

1-Diethylcarbamyl-4-methylpiperazine hydrochloride, also known as Hetrazan and 84-L, has a low toxicity and causes few side reactions.

The intraperitoneal LD_{50} in mice was 248 mg. per kilogram and in rats, 465 mg. per kilogram. The oral LD_{50} in mice was 660 mg. per kilogram and in rats, 1380 mg. per kilogram.

Mice, rats, rabbits, and dogs readily tolerated intraperitoneal injections of 100 mg. per kilogram.

Daily intraperitoneal doses of 50 mg. per kilogram in rabbits and 100 mg. per kilogram in rats, five days per week for fourteen weeks, produced no evidence of toxicity. Twenty-five milligrams per kilogram twice a day, orally, for two months produced no evidence of toxicity in dogs.

The compound was not irritating; it produced no local anesthesia and had no effect on the eye, on the isolated uterus or intestine, or on the blood sugar. It was mildly diuretic and analgesic. Intravenous doses of 2 to 25 mg. per kilogram in unanesthetized dogs stimulated the respiration. The heart and blood pressure were not affected by rapid intravenous injections of 0·5 mg. per kilogram, but larger intravenous doses in unanesthetized dogs produced a transient deviation from the normal.

The compound was rapidly excreted by the kidney. In rats and mice the rate per hour was approximately one-third of the intraperitoneal LD_{50}.

Eichbaum, F. W. (1947.) Potenciação da ação vermicida do hexylresorcinol por detergentes. Experiências *in vitro* com Ascaris de porco. **[Effects of detergents on the vermicidal activity of hexylresorcinol.** ***In vitro*** **experiments with hog ascaris.]**—*Mem. Inst. Butantan.* **20.** 203–218. [English summary.] [Abst. in *Trop. Dis. Bull.* **46.** 54. (1949), copied *verbatim*. Signed: H. Harold Scott.] **2473**

Three sets of tests were undertaken: (1) The vermicidal action of hexylresorcinol alone, of the detergents alone, and of the combination of the two in physiological saline, and in Tyrode's solution. (2) The synergistic activity of sodium anacardate and of the anacid fraction of cashew nut oil. By the "anacid fraction" is implied that part of the oil which remains after precipitation of anacardic acid by hydroxide of lead; its chief components are cardol and anacardol. (3) The influence of the presence of mucus on the vermicidal action of hexylresorcinol alone and with detergents. The following substances were used in the tests: 5 per cent. solution of hexylresorcinol; 5 per cent. aqueous solution of sodium anacardate; the anacid fraction of cashew oil (see above); 10 per cent. anacardol in alcohol; the oil itself, 10 per cent. in alcohol; sodium tetrahydro-anacardate, 5 per cent. in water; and the following sodium salts: ricinoleate, oleate, linoleate, stearate, and palmitate, all in aqueous solution, the first two 5 per cent., the third 1 and 2·5 per cent., the others 1 per cent. The effect on the worms, *Ascaris suis*, was watched through a glass-fronted apparatus.

The vermicidal effect of hexylresorcinol is enhanced by detergents in certain proportions, but if the latter are high the effect is, in part at least, inhibited. Sodium anacardate, anacardol, the anacid fraction and a tincture of the oil enhance the action, especially the first and third

of these. The first and last are fairly powerful vermicides themselves.

In Tyrode's solution, the effectiveness is lowered, owing to the formation of insoluble Ca and Mg salts. Mucus inhibits the anthelmintic activity of hexylresorcinol, but very slightly if detergents are present.

KANEGIS, L. A. (1948.) **A new treatment for ascariasis in dogs and cats.**—*J. Amer. vet. med. Ass.* **113.** 579–581. **2474**

In tests on 18 cats with diethylcarbamazine dihydrogen citrate the most effective doses were either two doses of 25 mg. per kg. or one dose of 50 mg. per kg. administered orally, neither fasting prior to treatment nor a purgative given afterwards being necessary. Eight kittens (2·3–3·5 lb. weight) were each given a single dose of 25 mg. per lb.; this is slightly more than 50 mg. per kg. Results were found to approach 100% efficiency.

In toxicity tests eight kittens were given doses up to 36·6 mg. per lb. body weight and seven dogs were given 50 mg. per lb., in each case after feeding. One dog vomited 40 min. after dosing. In none of the other treated animals were there any abnormal symptoms.—NESTA DEAN.

DESCHIENS, R. (1948.) Les substances toxiques vermineuses, leur pouvoir pathogène, leur identification. **[Toxic substances produced by helminths.]**—*Ann. Inst. Pasteur.* **75.** 397–410. **2475**

This paper reviews the history of the investigation of toxins produced by parasitic worms and reports some observations on substances extracted from *Ascaris megalocephala*. Techniques for extraction are described and it is stressed that the extracts are of labile character losing activity in three days at 20°C. and in eight days at 0°C. The best method of extraction is with trichloracetic acid and g. pigs are most suitable as experimental animals.

The toxins were classified into two groups, one consisting of polypeptides and the other of eosinophilic substances of protein type. Specific toxic reactions were distinguished from an anaphylactic reaction of more general character. The reaction was either acute or chronic and in the latter instance there were inflammatory oedematous infiltrations and necrotic foci in the lungs, kidneys and liver.

It is suggested that a knowledge of the specific toxins produced by parasitic worms will be of use in chemotherapy.—S. BRIAN KENDALL.

FRICK, L. P., & ACKERT, J. E. (1948.) **Further studies on duodenal mucus as a factor in age resistance of chickens to parasitism.**—*J. Parasit.* **34.** 192–206. **2476**

Age-resistance is one of the most important types of immunity elicited by animals to helminths. Hosts which become infected at susceptible ages are capable of expelling most of their helminths when the resistant age is reached. The development of helminths is retarded when they enter hosts which have attained a resistant age before becoming infected. This is particularly true of *Ascaridia galli*. Earlier it was found that the number of goblet cells in that part of the small intestine of the fowl inhabited by the nematodes increased in numbers in chickens up to 124 days of age. These increases in numbers were closely related to the retardation of worm growths due to the age of the fowl. The duodenal mucus from resistant chickens was considered to contain some factor which retarded the growth of the worms when that from young chicks, 66 days old, appeared to lack the resistance factor. The findings reported in the present paper show that the inhibiting factor is present in both autoclaved and unautoclaved duodenal mucus of older fowls and that it may be dissolved from the mucus in 0·832% saline. A new technique was developed for handling the mucus. Unautoclaved mucus presented difficulties as it was difficult to prevent lysis and to recover the mucus in a sterile condition owing to the presence of large numbers of bacteria in the intestine. If, however, the mucus is soaked for about nine days in 0·832% saline all the inhibitor-containing fraction will go into solution and the washing and leaching can be done at low temperatures; this reduces bacterial action. After leaching, the mixture can be filtered to remove all micro-organisms. The bacteria-free filtrate may be used in the same way as the whole mucus-medium mixtures.—C. HORTON SMITH.

See also absts. **2568** (trichina larvae); **2621** (echinococcus).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

DA SILVA, R. A., AMORIM, L. DE M., & CARDOSO, S. B. (1947.) Estudos sôbre a ocorrência de tumores mamários na cadela. **[Mammary tumours in the bitch.]**—*Veterinaria, S. Paulo.* **1.** No. 1. pp. 49–54. **2477**

In a series of 79 neoplasms in dogs, there were 22 mammary tumours, 12 of which were simple adenocarcinomas and 10 mixed tumours.

The simple tumours comprised five adenocarcinomas, two papilliform adenocarcinomas with malpighian metaplasia of the papillae, two papilliform adenocarcinomas without metaplasia,

two resembling sarcoma of the milk duct in women, and one with patches of simple carcinoma alongside typical adenocarcinomatous areas.

The mixed tumours comprised six cases with hyaline cartilage, five with embryonic connective tissue, three with smooth muscle and one with bony tissue.

As most of the tumours were surgically removed, metastases were rarely seen, but two were found in nymph nodes, and one in the lungs. —I. W. JENNINGS.

GARDNER, W. U. (1948.) **Hormonal imbalances in tumorigenesis.**—*Cancer Res.* **8.** 397–411. [Author's summary copied *verbatim.*] **2478**

Tumors of four endocrine glands arise under conditions of hormonal imbalances in experimental animals. The gonadotrophic hormones of the pituitary, in part by experimentation and in part by assumption, have been associated with tumours of the testes and ovaries. Pituitary chromophobe adenomas develop in estrogen-treated mice of some strains but not in others and the tendency to acquire such tumours is transmitted by both male and female mice to their hybrid offspring. An environment deficient in gonadal hormones and high in gonadotrophic hormone (F. S. H.) [follicle stimulating hormone] results in adrenal cortical tumours in mice of some strains and in hyperplastic growth of the adrenal cortex in mice of other strains.

DE KOCK, G., & QUIN, J. I. (1948.) **Bioclimatological studies on white rats in South Africa. No. 1.—Skin cancer in rats following continued exposure to sunlight.**—*Onderstepoort J. vet. Sci.* **23.** 349–365. **2479**

The authors succeeded in producing neoplastic growths in white rats in 14 out of 22 cases, after exposing the animals to the sun daily for four and a half hours over long periods. The first appearance of new growth was noted after ten months. One rat, in a group exposed for two and a half hours daily, developed carcinoma after 20 months. The tumours developed in the hairless skin, *i.e.*, ears, eyelids, nose and feet, but the tail was never affected, owing no doubt to its protective keratinization. In all cases, a diagnosis of epidermoid carcinoma was made. Control rats kept in the shade failed to develop skin cancer.—I. W. J.

See also abstr. **2506** (fowl paralysis).

NUTRITIONAL AND METABOLIC DISORDERS

NEWELL, G. W., ERICKSON, T. C., GILSON, W. E., GERSHOFF, S. N., & ELVEHJEM, C. A. (1949.) **Studies on human subjects receiving highly agenized food materials.**—*J. Lab. clin. Med.* **34.** 239–245. [Authors' summary copied *verbatim.*] **2480**

Nineteen patients, including five with epilepsy, have been fed a diet containing twenty-two to thirty times the amount of Agenized material contained in a normal diet. Physical, neurological, and electroencephalographic examinations have failed to disclose any abnormal changes as the result of such a diet and none of the patients has developed epileptic seizures as a result of this diet. The results are discussed in relation to previous studies which have shown that Agenized protein produces an epileptic condition (running fits) in dogs and other animals. It is suggested that this species difference in response to Agenized material represents a species difference in absorption or detoxifying mechanisms.

ELITHORN, A. (1949.) **Effects of agenized flour on man.**—*Lancet.* **256.** 143–146. [Author's summary and conclusions copied *verbatim.*] **2481**

The original intention of this investigation was to compare children from whose diet agenized flour had been excluded with children receiving flour agenized at the current commercial rate. After eight months no differences were detected.

Shortly before the investigation closed, supplies of flour agenized at 12 g. per sack became available. The effect of a diet prepared from this flour was tried on the children who had so far been free of agenized flour for eight months. Immediately after the change most of these children did not maintain their normal weight increase; but, on the other hand, their performance on the psychomotor tests was better. These changes do not reach a level of statistical significance, and their relation to the change in diet is not clear.

The children ate on the average 340 g. of flour a day. This represents about half their daily intake of calories, protein, and carbohydrate.

Two adult volunteers lived for eight weeks on a diet containing flour agenized at 24 g. to the sack, their average daily intake of the treated flour being 360 g. No impairment was noted in either physiological or psychological functions.

These results are in agreement with those obtained in America by Newell et al. (1947), who detected no changes in man. In their investigation five persons received 105 g. of wheat products a day for 14–28 days, with 3–20 g. of agene per cwt. of flour. They mention, however, that more detailed studies are shortly to be published.

Thus it is fair to conclude that the effect of commercially agenized flour on man is difficult to detect. It may be harmful, beneficial, or inactive.

WATSON, C. J., KENNEDY, J. W., DAVIDSON,

W. M., Robinson, C. H., & Muir, G. W. (1947.) **Digestibility studies with ruminants. XI. The effect of the nutritive ratio of a ration upon its digestibility by cattle.**—*Sci. Agric.* **27.** 600–608. **2482**

Rations were made up with nutritive ratios varying from 1 : 2·63 to 1 : 8·41 with timothy hay, barley and soya bean oil meal. The coefficients of digestibility of the mixed rations were determined with eight grade Shorthorn steers. The coefficients of the individual feeds were also determined. These were used to calculate the coefficients of digestibility of the mixed rations and, by comparing the coefficients so calculated with those obtained in the digestion trials, it was found that the nutritive ratio of the mixed rations did not influence their digestibility.—R. Gwatkin.

Neumann, A. L., Krider, J. L., & Johnson, B. C. (1948.) **Unidentified growth factor(s) needed for optimum growth of newborn pigs.**—*Proc. Soc. exp. Biol. N.Y.* **69.** 513–516. [Authors' summary copied *verbatim.*] **2483**

The addition of Reticulogen (a 20-unit antipernicious anemia liver extract) to a synthetic milk diet resulted in an increased growth rate in baby pigs over an 8-week period. The final weights of pigs receiving Reticulogen averaged 19·96 and 21·6 kg as compared with 13·53 and 16·0 kg for those not receiving Reticulogen in two comparisons.

Dewar, A. D., & Newton, W. H. (1948.) **The determination of total metabolism in the mouse.**—*Brit. J. Nutrit.* **2.** 123–141. **2484**

A detailed description of a closed circuit apparatus for estimating total metabolism in mice. Experiments are reported in which measurements were made on individual mice over periods of several days. The accuracy of the method and the validity of the results obtained are critically discussed.—P. H. Herbert.

Jubb, A. C., Cederquist, D., Nitchals, R. M., & Ohlson, M. A. (1947.) **Effects of diets containing foods with possible antibiotic properties on the growth and development of white rats.**—*Quart. Bull. Mich. agric. Exp. Sta.* **30.** 136–149. **2485**

In an effort to detect hitherto unidentified food factors which might be important in the control of infections, the authors studied the effect of garlic, and of barley and maize. Two groups of albino rats were fed semi-synthetic basal diets containing 2·5% and 5% powdered garlic (equivalent to 10 and 20% fresh garlic), respectively, and two other groups received similar diets in which the maize starch had been replaced by whole ground barley for one, and by whole ground maize, for the other. Equivalent groups of controls were fed the basal diets alone.

While the growth of the males was slightly depressed by the garlic, the females fed 5% garlic were heavier than those that had been fed 2·5%, and the offspring of the 5% group were sterile.

Haemoglobin concentrations and erythrocyte counts were only insignificantly depressed by the garlic, and not affected by either barley or maize.

The effect of garlic on the reproductive performance was that both generations of females fed the 2·5% diet reared the largest number and percentage of their young, but the weight of the young on weaning was less than that of the young in either the 5% or in the control group.

Barley was better than maize, in that a greater percentage of the young born were reared in both the first and the second generation.—G. P. M.

Wahi, P. N. (1949.) **Diet and cirrhosis of the liver.**—*Arch. Path.* **47.** 119–152. [Author's summary and conclusions copied *verbatim.*] **2486**

Rats weighing approximately 50 Gm. and fed a diet high in carbohydrate and low in protein show hepatic damage, which expresses itself as necrosis of the parenchyma. This may end in postnecrotic scarring if the animal lives long enough. Animals weighing over 100 Gm. are more resistant to the effect of this deficient diet and live longer. Their livers show varieties of lesions like focal or diffuse necrosis, fatty infiltration and incipient cirrhosis. In the development of cirrhosis of the liver there are two stages; the first consists of diffuse fatty infiltration of the liver cells, and the second, of fibrous tissue proliferation and regeneration of liver cells. Cirrhosis of the liver is not a necessary sequel to injury of the liver cells, and fatty infiltration does not necessarily terminate in cirrhosis. It is possible that some noxious agent like a toxin, bacterium or a virus, especially in infantile cirrhosis, acts as a precipitating factor. The quantitative determination of fibrous tissue has been found more useful in determining the presence of cirrhotic changes in early stages than the microscopic examination of stained sections.

Lewis, H. B. (1949.) **Protein metabolism in disease.**—*Bull. U.S. Army med. Dep.* **9.** 364–370. [Author's summary copied *verbatim.*] **2487**

Normal human blood plasma is made up of an extremely complex mixture of proteins, perhaps hundreds of distinct proteins, many of which have not yet been characterized adequately. In disease, the changes of the plasma proteins are marked. Not only are there quantitative changes in the concentration and distribution of the various fractions, but also often qualitative changes may be observed in which proteins not normally present, e.g. Bence-Jones proteins, may appear in the plasma. As our knowledge of electrophoresis progresses we shall find that it will assume

importance as a valuable tool in the study of changes in plasma protein in disease.

ROBSCHEIT-ROBBINS, F. S., & WHIPPLE, G. H. (1949.) **Dietary effects on anemia plus hypoproteinemia in dogs. I. Some proteins further the production of hemoglobin and others plasma protein production. II. The findings with milk products, wheat, and peanut flours as compared with liver.**—*J. exp. Med.* **89.** 339–358; & 359–368. [Authors' summaries, I. slightly amended, II. copied *verbatim*.] **2488**

I. Doubly depleted dogs (anemic and hypoproteinemic) respond favorably to all the diet proteins used in the above experiments.

Egg products (whole egg, albumin, or egg yolk) are well utilized by these dogs. Egg proteins favor the production of plasma protein and in some experiments the output of plasma protein is actually more than the output of hemoglobin. In contrast fresh beef muscle favors hemoglobin production—the output being 3 or 4 times that of plasma protein. Processed egg albumin was not well utilized and there was weight loss. Beef muscle (fresh or processed) gives a *total* blood protein output about twice that with egg feeding and there is a striking preponderance of hemoglobin output. Beef heart and salmon muscle show a pattern much like beef muscle. The total blood protein output is below that due to beef muscle.

II. Casein (purified or commercial) in this type of experiment falls in the top bracket as a protein consistently favorable for maximal new hemoglobin and plasma protein production in doubly depleted dogs (anemic and hypoproteinemic). Lactalbumin is less favorable for total blood protein production and the ratio of plasma protein to hemoglobin is high—that is lactalbumin favors plasma protein production as compared with casein, or is less favorable for hemoglobin production. Peanut flour (purified or commercial) is less than half as effective as casein in promoting new blood protein production. The ratio of plasma protein to hemoglobin is about the same as casein.—Wheat gluten as tested is distasteful to dogs. It is neither very good nor very poor for blood protein production when it is eaten. There is nothing unusual about the response. Weight loss usually confuses the picture.

Liver stands as a control base line for the above experiments. Its capacity to further hemoglobin and plasma protein production is well established. The production of hemoglobin was about 3 times that of plasma protein in the experiments.

DRILL, V. A., LOOMIS, T. A., & BELFORD, J. (1947.) **Effect of protein and carbohydrate intake on liver injury produced in dogs by carbon tetrachloride.**—*J. industr. Hyg.* **29.** 180–184. [Abst. in *Yale J. Biol. Med.* **20.** 217. (1947), copied *verbatim*. Signed: R. T. M.] **2489**

The effect of hepatic injury produced by carbon tetrachloride (0·125 cc./K) was studied on dogs receiving a low protein-high carbohydrate (8 per cent casein) and a normal protein-low carbohydrate (20 per cent casein) diet. Bromsulphalein retention tests, performed every two days, showed a greater degree of hepatic dysfunction in animals fed the normal protein diet as against those receiving a low protein-high carbohydrate diet for three and one-half or six weeks. Fatty changes in the liver were not significantly different in the two groups of dogs. Necrosis was not observed in six of the animals fed the low protein diet but was present in three of the six dogs fed the normal protein diet. The effect of low protein intake in increasing the degree of hepatic injury that is observed with other chlorinated hydrocarbons, does not seem to be present when carbon tetrachloride is the damaging agent.

LUECKE, R. W., MCMILLEN, W. N., THORP, F., Jr., & TULL, C. (1947.) **The relationship of nicotinic acid, tryptophane and protein in the nutrition of the pig.**—*J. Nutrit.* **33.** 251–261. **2490**

The nicotinic acid requirement of pigs was studied in relation to the tryptophane content of the food and with special reference to rations consisting largely of maize. Six groups of five animals were fed *ad libitum*. Average daily intakes were recorded, together with estimations of urinary excretion of tryptophane, nicotinic acid and N^1-methyl nicotinamide, and other members of the vitamin B_2-complex. Three basal diets containing 19% (A), 14% (B) and 16% (C) of protein were used. In A and B, maize was the major constituent and in C, oats. The nicotinic acid contents were 5, 6 and 6 mg. per lb. respectively. Pigs fed on the oats diet had a low rate of weight gain, attributed to the high fibre content, but no symptoms or lesions suggestive of nicotinic acid deficiency. Both maize diets caused lesions of the large intestine, more severe with the lower protein content. Bacterial infection was excluded and this effect is attributed to the lower tryptophane content of maize compared with that of oats. Supplementing either of the deficient diets with nicotinic acid (30 mg. daily) prevented the lesions and produced healthy animals, the rate of weight gain being higher when the proportion of protein in the ration was greater.—P. H. HERBERT.

GROSCHKE, A. C., ANDERSON, J. O., & BRIGGS, G. M. (1948.) **Peculiar enlargement of eye-**

balls in chicks caused by feeding a high level of glycine.—*Proc. Soc. exp. Biol. N.Y.* **69.** 488–491. **2491**

This report describes the appearance of a peculiar enlargement of the eyeballs, depression of growth and tremors seen in chicks fed a highly purified diet containing 8% glycine. The underlying cause of the eye enlargement was not determined. It was not ascertained whether other amino acids would cause the same condition.

—D. Luke.

Lorenzen, E. J., & Smith, S. E. (1947.) **Copper and manganese storage in the rat, rabbit, and guinea pig.**—*J. Nutrit.* **33.** 143–154. **2492**

The copper and manganese content of the livers in the three species were measured at birth, two, three and eight weeks later and at full maturity. Ten animals were killed in each group, and more when the livers were so small that determinations on single organs could not be made. Concentrations were expressed as μg. per g. dry weight of liver. In g. pigs at birth the copper concentration in the liver was 67 falling to 19 at eight weeks, and rising to 23 at maturity. Manganese concentration rose from 1·3 to 3·5 at two weeks and 4·1 at three weeks, after which it was steady. Similar changes in copper concentration were noted in rabbits and rats. Copper at birth was 37 in rabbits and 58 in rats. At maturity it was 23 in rabbits and 34 in rats. Rabbits had a manganese concentration of 2·3 at birth, 3·4 at two weeks, 2·7 at three weeks, 4·0 at eight weeks and 1·8 at maturity. In rats the concentration was 1·9 at birth, 1·5 at two weeks, 2·5 at three weeks and remained constant thereafter. The authors emphasize the importance of calculating total liver content of each metal, as concentration alone may give misleading information on storage of these metals.—P. H. Herbert.

Lee, H. J. (1948.) **The relationship of copper to pigmentation in black-wooled sheep.**—*Med. J. Aust.* **2.** 757. **2493**

L. discussed the general phenomenon of colour banding in the fleeces of black sheep observed from time to time throughout Australia. Unpublished observations by himself and H. B. Carter have demonstrated a strong association between the occurrence of de-pigmentation in the wool fibre and other manifestations of copper deficiency in sheep, such as the loss of normal crimping in the fleece staple, generally known as "steeliness" in South Australia. Black-wooled sheep on copper deficient pastures commonly lose both crimp and pigment and both may be restored simultaneously by appropriate copper therapy. However, pigment may disappear from the fibres in some instances without loss of crimp, suggesting that the pigmentary system is more sensitive to copper deprivation than the mechanism of crimp formation. These observations fit well into the growing volume of experimental evidence that copper plays a most important role in normal melanin synthesis in the animal body and that this applies to the sheep as well as to other species.

—H. B. Carter.

Schmitt, H. G. (1949.) Über die calciprive Osteopathie der Haustiere. Ein röntgenologischer Beitrag zur Frage der Osteomalazie. [**Osseous calcium deficiency in domestic animals. Osteomalacia and X-rays.**]—*Tierärztl. Umsch.* **4.** 40–43. **2494**

An illustrated report on the X-ray interpretation of the localized osseous changes occurring in osteomalacia in domestic animals.

A knowledge of the two principal lesions associated with calcium deficiency—calloused zones of rarefaction and slow pathological fractures—together with other factors, such as the symmetrical occurrence of that type of damage, will allow a correct diagnosis to be made.—G. P. M.

Cuttino, J. T., Paris, A. S., & Rosenthal, M. H. (1948.) **Effect of sodium chloride deprivation on the growing rat.**—*Arch. Path.* **46.** 260–267. [Authors' summary copied *verbatim*.] **2495**

Sodium and chloride, chloride, and sodium deficiencies were studied in colonies of growing rats by means of synthetic diets. We have been unable to determine or recognize hemorrhagic tendencies in any of these deficiencies. Changes in the conjunctiva and meibomian ducts similar to those described for sodium deficiency were found in the animals of this experiment. We were unable to find a specificity for this lesion since it was observed with equal frequency in the sodium and chloride-deficient group and the sodium-deficient group, and was noted in 3 rats of the chloride-deficient group. Calcium deposition in the renal tubules similar to that described in connection with chlorine deficiency was found in these test groups, but without consistency or specificity. We were unable to confirm the findings of hydronephrosis.

I. Pulsford, M. F. (1949.) **Microphthalmia in pigs.**—*Med. J. Aust.* March 5th. pp. 328–329. **2496**

II. Marcq, J., & Hennaux, L. (1946.) Microphtalmie congénitale chez le porc. Son caractère héréditaire. Son étiologie. [**Congenital microphthalmia in the pig. Hereditary etiology.**]—*Bull. Inst. agron. Gembloux.* **15.** 79–98. [English, Dutch and German summaries. Abst. in *Nutr. Abstr. Rev.* **18.** 750. (1949), copied *verbatim*. Signed: A. M. Copping.] **2497**

I. Microphthalmia was found in pigs

slaughtered at abattoirs. The condition varied from the presence of an almost normal eye to a small black nodule with some traces of cornea. On microscopic examination all structures were abnormally developed and abnormally disposed. Field evidence from one subject suggested that maternal vitamin A deficiency may have been the cause.—D. C. Blood.

II. The occurrence of congenital blindness in young pigs was investigated in 5 litters on one farm and 4 on another. Careful histological study indicated that the condition was microphthalmia rather than anophthalmia. It was apparently not hereditary since blind animals did not have blind offspring.

The breeding ration was not available for analysis but a deficiency of vitamin A was suspected, and analysis of blood gave low values for the vitamin A content. Four sows were then given a ration lacking in vitamin A and carotene. Two died apparently from poisoning and the survivors failed to become pregnant in spite of repeated attempts at mating.

The observations are discussed with reference to reports in the literature on the effects of lack of vitamin A and of toxic substances on the young pig. It is concluded that the blindness was due to a combination of various dietary troubles, including deficiency of vitamin A and probably also the presence of toxic substances.

Wilson, J. G., & Warkany, J. (1948.) **Malformations in the genito-urinary tract induced by maternal vitamin A deficiency in the rat.**—*Amer. J. Anat.* **83.** 357–407. [Authors' summary copied *verbatim*.] **2498**

The genito-urinary tracts were studied histologically in 42 fetal and newborn rats, from mothers maintained prior to and during pregnancy on vitamin A-deficient diets, and were compared with controls of comparable ages, from mothers fed the same diets supplemented with vitamin A.

A great variety of malformations was found throughout the genito-urinary tract in the offspring of A-deficient mothers. Certain of these were almost as common in occurrence as the ocular abnormalities (approximately 75%) previously reported.

Anomalies of paraplasia, that is, those resulting from aberrant embryonic processes, were exemplified by: fused kidneys and an occasional instance of stenosis in ureters and homologous genital ducts. These were relatively rare, both in type and individual incidence.

Aplasias, or anomalies characterized by failure of a structure or part to develop, were represented by instances of failure of the male accessory glands to appear, particularly the seminal vesicles and bulbourethral glands, and in the complete lack of vaginal development in most of the females. These were also few in type, but the incidence within each type was high.

Malformations of hypoplasia, those resulting from the arrest or retardation of an embryonic process, whether progressive or regressive in character, accounted for a large majority of all abnormalities observed. Retarded progressive development was exemplified by: late partitioning of the cloaca, tardy appearance of Müllerian ducts, and slow differentiation of the urogenital sinus. Examples of arrested progressive development were: positional abnormalities of the kidneys, ectopic ureteric openings, incomplete caudalward growth of Müllerian ducts, poor differentiation of mesonephric ducts, hypospadias and failure of testicular descent. Hypoplasia in the special sense of retarded or arrested regressive processes of development was seen in: persistance of heterologous genital ducts in both sexes, and retention of the urethral plate.

No instance of hyperplastic malformations, those characterized by over-growth or over-activity of an embryonic process, was encountered.

All newborns and fetuses older than 18 days gestational age which bore malformations also exhibited keratinizing metaplasia in epithelia derived from the embryonic urogenital sinus. Epithelial metaplasia was found at no place in the body other than in the lower genito-urinary tract, where it appeared at an earlier age than did the normal keratinization of the epidermis. The occurrence of keratinizing metaplasia was the justification for concluding that these fetuses were experiencing *in utero*, a state of vitamin A deficiency similar to that in the mothers.

Molander, D. W. (1949.) **A study of the absorption of fat and carotene from the gastro-intestinal tract.**—*Yale J. Biol. Med.* **21.** 201–210. [Author's summary copied *verbatim*.] **2499**

Absorption from the gastro-intestinal tract of an emulsion of mineral oil containing carotene in human serum with a particle size of 0·5μ was demonstrated. About 65 per cent of such an emulsion fed was absorbed, whereas 66 per cent (20·6 mg.) of the contained carotene was absorbed. Carotene was absorbed in a similar degree when the carrier was corn oil. It was demonstrated that the fatty acids of corn oil are not efficient carriers of carotene from the gastro-intestinal tract into the tissues. The distribution of absorbed carotene was studied: mineral oil and corn oil gave a systemic distribution, whereas the fatty acids of corn oil carried most of the carotene to the liver.

Morgan, A. F., Axelrod, H. E., & Groody, M. (1947.) **The effect of a single massive dose of vitamin D_2 on young dogs.**—*Amer. J. Physiol.*

149. 333–339. [Abst. in *Bull. Hyg., Lond.* **22.** 783. (1947), copied *verbatim.* Signed: H. E. HARDING.] **2500**

Eight newly-weaned puppies were given a stock diet of casein, cornstarch, cottonseed oil, wheat germ, brewer's yeast, salt mixture and calcium carbonate, which contained 1·23 per cent. calcium and 0·78 per cent. phosphorus. They were also given cod liver oil reinforced with carotene, which provided 100 I.U. vitamin D and 2,250 I.U. vitamin A daily. When they were 4–5 weeks old, they were given a single dose of irradiated ergosterol containing 450,000 I.U. vitamin D_2 and probably some tachysterol but no toxisterols. Afterwards, they were given 2,000 I.U. vitamin A daily, but no vitamin D.

Immediately after the administration of the test dose, all the puppies suffered bloody diarrhoea, loss of appetite, and excessive thirst. The two smallest animals died in 2 days. The remainder were then given 1,000,000 I.U. vitamin A by mouth. A third animal died after 14 days, and a fourth after 37 days. One of the survivors was killed after 88 days, and the remaining 3 after 241 days.

Severe malocclusion of the jaws occurred in all the animals that lived more than a fortnight, the most extensive malformation of the jaws and teeth being shown by those examined 37 and 88 days after medication. Extensive calcification was found in the lungs and moderate calcification in the hearts and kidneys of all the animals, but was more marked in the two animals which died or were killed early. This finding suggests that decalcification of the soft tissues took place gradually during recovery.

In the three animals that survived for the longest period, the serum calcium remained elevated for 190 days, but had almost or quite reached a normal level at 241 days. Determinations of the calcium and phosphorus balance showed that both elements were still being retained after 189 and 238 days.

BATHE, D. R. (1948.) **Bloat: observations on Somerset pastures.**—*Agriculture, Lond.* **55.** 235–238. **2501**

With the increased use of rotational pastures, bloat has become a serious problem on some farms. From a study of the incidence of the disease in the Shepton Mallet area it was found that in 53 dairy herds, 87 cases, 4 being fatal, occurred amongst cows and heifers during 1944 and 40 cases, 3 being fatal, during 1945. Bloat was most frequent on weed-free prolific swards from three-year leys sown without a nurse-crop, particularly, as in 1944, when climatic conditions favour rapid growth. The grazing of young swards in their full flush of growth must be carefully managed, especially during the months of June and July when the incidence of the disease is at its highest.—J. A. NICHOLSON.

BAILEY, G. L., BARTLETT, S., & FOLLEY, S. J. (1949.) **Use of L-thyroxine by mouth for stimulating milk secretion in lactating cows. [Correspondence.]**—*Nature, Lond.* **163.** 800. **2502**

Four groups of six cows were given daily doses of 25 mg., 50 mg., 100 mg. and 150 mg. respectively of L-thyroxin by mouth for 21 days. With the three lower dosage levels a graded response was obtained both in milk yield and in the rate of the heart beat. The 150 mg. dosage rate produced sweating in some of the cows after 14 days. With the 100 mg. dose there was an increase of 6·2 lb. of milk per cow per day after 14 days, and 5·9 lb. after three weeks.

The authors claim that synthetic L-thyroxin has several advantages over iodocasein *viz*, there is no need for a bio-assay, there is less risk of iodism and, being virtually tasteless, L-thyroxin is readily eaten by the cow.—D. LUKE.

KENDALL, K. A., NEVENS, W. B., & OVERMAN, O. R. (1948.) **The lactation response as limited by feeds produced under two systems of soil fertilization.**—*J. Nutrit.* **36.** 625–637. [Authors' summary slightly amended.] **2503**

Differences in the nutritive values of lespedeza hay, soybean hay, and wheat grain were carefully appraised through the lactation responses of rabbits. The use of doe litter mates and the paired feeding technique made such an evaluation possible.

Data are reported for 17 pairs of pair-fed, mated, doe rabbits whose rations were made up of feeds produced in a single soil type; and for 8 pairs of litters produced by these does, to an age of 46 days from conception. One ration was made up of feeds grown on P + K-fertilized soil; the other consisted of feeds grown on a similar soil fertilized with P + K + Ca.

The P + K + Ca rations were found to be superior to the P + K rations in the following respects: In trial 1 they appeared to be more palatable. No noticeable differences in palatability were observed in trials 2 and 3 when soybean hay replaced lespedeza hay. The average litter size showed some tendency to be larger. Average daily weights of the young were greater after reaching an age of 38 days from conception. An analysis of the variance of the trial 1 data showed that body length, gastrointestinal contents, and the quantity of dry matter, total nitrogen, and ash deposited in the young fed solely on the milk of mothers fed the P + K + Ca ration were significantly greater than in their P + K-nourished pair mates.

Differences in the percentages of carcass nitrogen and ash were not significant.

CUNNINGHAM, I. J. (1949.) **A note on the cause of tall fescue lameness in cattle.**—*Aust. vet. J.* **25.** 27–28. **2504**

A condition, popularly known as "fescue foot" develops after grazing on this grass (*Festuca arundinacea*), particularly if the animals are on the pasture for a short period only. Cattle grazing it all the year round are less likely to be affected. Lameness may develop 10–14 days after first eating the grass. Local heat and swelling with severe pain appear first with later drying and hardening of the skin below a definite indented line of demarcation which may be near the digits or higher up near the fetlock or on the cannon. Below the line the skin is cold and the limb may slough off at this point. In the past the condition has been assumed to be due to ergot (*Claviceps purpurea*), but C. points out that there is no seasonal incidence of the disease and records that feeding of the dried grass containing no ergot produced typical lameness in an experimental cow.—D. C. BLOOD.

LINDSAY, S., ENTENMAN, C., & CHAIKOFF, I. L. (1948.) **Pancreatitis accompanying hepatic disease in dogs fed a high fat, low protein diet.**—*Arch. Path.* **45.** 635–638. [Authors' summary copied *verbatim*.] **2505**

Pancreatitis occurring in dogs fed a high fat, low protein diet is described. It was interstitial in type and consisted of acute necrosis with secondary inflammation and scarring. Acinous involvement was secondary and minimal. The pancreatic lesion was associated with heavy fat infiltration and early fibrosis of the liver.

ISAKSSON, A. (1948.) **Predisposing nutritional factors for neurolymphomatosis in chickens.**—*Off. Rep. 8th World's Poult. Congr., Copenhagen. Vol. I.* pp. 725–727. [In English. English, Danish & French summaries, English summary copied *verbatim*.] **2506**

According to observations made in Sweden during the past two years, neurolymphomatosis can be prevented and mild cases corrected when the ration is supplemented with dried brewer's yeast (2% of the dry mash) and $FeSO_4$, $MnSO_4$ and $CoSO_4$ (0·02% each of the dry mash). The active factor or factors have not yet been isolated.

ROBERTSON, E. I., ANGSTROM, C. I., CLARK, H. C., & SHIMM, M. (1949.) **Field research on "stunted chick" disease.**—*Poult. Sci.* **28.** 14–18. **2507**

"Stunted chick disease" is the name applied to a peculiar condition in chicks, 2–4 weeks old, characterized by lack of growth, rough feathering and scabby incrustations at the corners of the beak and eyelids. Mortality in the present series of outbreaks varied from 25–75%.

In survivors treated with pantothenic acid, riboflavin, brewers' yeast and liver meal there was only slight increase in growth rate. The addition of varying amounts of litter to the ration, while depressing the growth rate, produced no other signs of the condition. There was some indication that the condition might be contagious.—D. LUKE.

COATES, M. E., KON, S. K., SHEPHEARD, E. E., & WHITE, E. G. (1947.) **Some observations on perosis in chicks.**—*J. comp. Path.* **57.** 232–239. **2508**

The effect of additions of manganese and choline chloride to a rachitogenic diet of OLSSON was studied. Cod-liver oil was added to prevent the onset of rickets.

It was found that the addition of 0·2% manganese sulphate significantly reduced the incidence of perosis. The degree of perosis was measured radiographically. The addition of choline chloride had no effect.

The various factors involved in the appearance of perosis are discussed and the authors consider that with natural foodstuffs the most likely deficiencies are manganese and possibly choline. There was no delay in the fusion of the bones of the hock in perotic birds.—D. LUKE.

See also absts. **2391** (nutrition and infection); **2522** (parenteral nutrition); **2581** (effects on fertility).

DISEASES, GENERAL

CARTER, M. G., & WELCH, K. J. (1948.) **Aspiration of timothy grass.**—*New Engl. J. Med.* **238.** pp. 832. [Abst. in *Amer. Rev. Tuberc.* **59.** 7–8 of abstracts. (1949), copied *verbatim*.] **2509**

An account of illness in eight children 14 months–14 years of age. There was a definite history of aspiration in five of the patients. All had developed immediate symptoms which were sustained and progressive. The early symptoms were fever, cough and loss of weight. There was foul sputum in six patients. Parts of the grass were found in lung lesions. The most striking histological change was extensive connective tissue proliferation about the bronchi and vessels with extension along the pulmonary septa.

PAVLOVSKII, E. N. (1946.) **[On the theory of natural foci of diseases transmissible to man.]**—*J. gen. Biol.* **7.** 3–33. [In Russian. English summary. Abst. in *Rev. appl. Ent.* Ser. B. **37.** 18–19. (1949), slightly amended.] **2510**

The numerous investigations that have been carried out in the Soviet Union during the last

15 years on the epidemiology of arthropod-borne diseases of man have shown that, like similar diseases in other countries, many of them are markedly local in occurrence and appear to be associated with definite centres or foci of infection. Foci that have arisen without human agency are termed natural, and they may exist in the complete absence of man and not reveal themselves until human contact with them is established, when they may disappear as a result of unfavourable conditions or become localised in human settlements. Natural foci are characterised by the presence of a disease organism, animal reservoirs in which it is maintained and arthropod vectors by which it is transmitted, and all three of these elements form a part of a natural association or biocoenosis adapted to a particular habitat. They may be limited in extent, for example to the burrows of wild animals, or be more diffused if the vectors are distributed over the ground or vegetation. When man appears in such zones, he may be infected by an arthropod vector that has itself become infected from a wild animal, and this explains the primary incidence of infection in unpopulated regions. Human infection from a natural focus may result from the activity and mobility of the vector as in flying insects, from prolonged stay in the area, or from direct contact (as in skinning) with an infected animal reservoir.

The diseases for which the occurrence of natural foci have been proved in the Soviet Union are relapsing fever, transmitted by *Ornithodorus spp.*, spring-summer encephalitis and spotted fever, both transmitted by ixodid ticks, cutaneous leishmaniasis, transmitted by *Phlebotomus*, plague in wild rodents and their fleas, and tularaemia. Sandfly fever also occurs in foci, but has not been proved to have an animal reservoir.

In order to facilitate further studies, natural foci are classified into different types according to their individual characteristics, and it is pointed out that epidemics of arthropod-borne diseases among troops or settlers in previously uninhabited areas can be avoided by preliminary investigations as to the existence of natural foci and appropriate preventive measures.

To illustrate the persistence of natural foci, the history of tick-borne relapsing fever transmitted by *O. tholozani*, Lab. & Mégn. (*papillipes*, Bir.) in the Republic of Kara-Kalpak in Central Asia, and also of sandfly fever transmitted by *P. papatasi*, Scop., in the Crimea is discussed; both appear to date from early times.

SHUTTLEWORTH, A. C. (1948.) **Dental diseases of the horse.**—*Vet. Rec.* **60.** 563–567. **2511**

Diseases of the incisor teeth are rare, and horses have thrived despite the loss of all their incisors, while the severe crowding which may result from faulty shedding of the deciduous teeth, production of supernumerary teeth, or traumatic displacement, rarely interferes with feeding. The commonest developmental fault is an over or under development of the mandible, which, if of some degree in the incisor region, gives freedom from wear at the extremities of the molars and leads to hook formation.

The two most important diseases of the premolars and molars are caries and paradontal disease. Clinically, caries commonly remains undiscovered until the disease is very advanced and the damage to the teeth great. The undermined crown may collapse, or the tooth may split into two or three equal portions. Paradontal disease particularly affects the heavy breeds. It attacks the gum, periodontal membrane, and bony alveolus. The primary cause is not clear, although it may be related to a vitamin A deficiency.

Secondary to disease, deformities may result. Shear-mouth follows persistent one-sided mastication so that the painful side may escape normal wear. "Step mouth" (teeth levels in steps) is due to complete or partial loss of teeth with overgrowth of the unopposed surfaces.

Treatment was discussed.—J. O. L. KING.

See also absts. **2501** (bloat); **2507** (stunted chick disease); **2551** (anaemia of infection); **2615** (abnormal tooth); **2616** (dermatitis); **2619** and **2620** (of laboratory animals).

POISONS AND POISONING

SKRYPNIK, E. I. (1945.) **[Cattle poisoning with water containing H_2S, chlorine and chlorides.]** —*Veterinariya, Moscow.* No. 10. pp. 42–44. **2512**

A winter outbreak of gastro-enteritis was traced to river water holding decomposed organic matter in suspension when frozen. Results of analysis were 492·7 mg. chlorine, 1,345 mg. chloride with some H_2S per l. The cattle were cured by injections of pilocarpine, caffeine and saline solution, being given sour milk to drink. —F. A. A.

VADAY, F. (1948.) Sertések konyhasómergezése. **[Sodium chloride intoxication of pigs.]**—*Magyar Állatorv. Lapja.* **2.** 98–100. [Abst. in *Nutr. Abstr. Rev.* **18.** 911. (1949), copied *verbatim.* Signed: I. FINÁLY.] **2513**

Owing to a post-war scarcity of salt a factory with 11,000 pigs obtained almost no salt for a long period. Subsequently 5 kg. blocks of salt were

freely offered to the pigs and consumed very quickly. More than 250 of the pigs showed symptoms of severe intoxication characterised by strong thirst, with inflammation of the brain and spinal marrow. All the symptoms were transitory.

SALOMON, K., & COWGILL, G. R. (1948.) **Porphyrinuria in lead-poisoned dogs.**—*J. Indust. Hyg. & Toxicol.* **30.** 114–118. [Abst. in *Bull. Hyg., Lond.* **23.** 520. (1948), copied *verbatim.* Signed: E. L. COLLIS.] **2514**

The early diagnosis of exposure to lead is often extremely difficult; hence importance attaches to the fact that porphyrinuria is one of the most sensitive signs of exposure in man, and that it occurs before other signs of lead poisoning, such as the appearance of stippled erythrocytes or secondary anaemia. The procedure, moreover, for estimating urinary porphyrins is simple. In order to obtain further knowledge on the subject, experiments were carried out on dogs, as these animals are highly sensitive to lead, exhibiting signs similar to those occurring in man. Lead acetate was given to the dogs in their food. Urine was collected over 9 to 10 days; then porphyrins were extracted and determined quantitatively with an Evelyn photoelectric colorimeter. Blood from the dogs was also analysed for lead from time to time. The dosage was only enough to cause mild clinical symptoms, slight loss of weight, and occasional diarrhoea and vomiting. The observations established that the dogs excreted increased amounts of coproporphyrin after ingestion of lead, but there was no close relation between the amount ingested and the amount of porphyrins excreted. Further, porphyrinuria was found to be a late rather than an early sign of exposure to lead.

FURMAN, D. P. (1947.) **Toxicity of benzene hexachloride to mammals.**—*J. econ. Ent.* **40.** 518–521. [Author's summary copied *verbatim.*] **2515**

The toxicity of commercial hexachlorocyclohexane of approximately 12 per cent gamma isomer content, to laboratory mice was determined to be of a relatively low order when administered *per os* or to the skin as a water suspension. Evidence is forwarded that the gamma isomer is responsible for only part of the toxicity of commercial benzene hexachloride to mammals. There was no evidence of a marked accumulative action on mice. No indication of toxic action to cattle was found when benzene hexachloride was administered *per os* in doses well above the range of probable ingestion in dipping procedures. No toxicity to cattle was apparent when dipped in suspensions of a concentration up to 0·5 per cent.

SAUBERLICH, H. E., & BAUMANN, C. A. (1947.) **Effect of dietary variations upon the toxicity of DDT to rats or mice.**—*Proc. Soc. exp. Biol., N.Y.* **66.** 642–645. **2516**

Mice fed 0·03–0·04% of D.D.T. in a medium fat diet of 5%, developed toxic symptoms and died; 0·1–0·15% of D.D.T. in the diet was necessary to produce a similar toxicity in the rat.

A reduction in the level of dietary fat to 0·5% decreased the toxicity of D.D.T. for both species; when the diet contained 15% of fat the symptoms of toxicity were increased, similar increases being observed when several different types of fat were used.

On a low protein diet (10%) the toxicity of D.D.T. was somewhat increased. On a high protein diet (30%) the effects were variable.

—ARTHUR W. MARRABLE.

GRAHAM, J. D. P., & HOOD, J. (1948.) **Actions of British anti-lewisite (2 : 3-dimercaptopropanol).**—*Brit. J. Pharmacol.* **3.** 84–90. **2517**

The toxicity of B.A.L. and its action on the toxicity of a number of metallic compounds used in chemotherapy were investigated by experiments on laboratory animals.

The LD_{50} of B.A.L. dissolved in water was found to be 100 mg. per kg. for white mice injected intraperitoneally. Small doses caused a sharp rise in blood pressure and a stimulation of respiration in rats and an abrupt fall in blood pressure accompanied by transient shrinkage of the spleen in cats.

Results of experiments are reported establishing the protective action of B.A.L. on white mice poisoned by arsenic, antimony, chromium and mercury compounds, and its additive effect on the toxicity of lead, gold, and bismuth compounds. The action of insulin (0·5 units per kg.) on rats was inhibited by the addition of 25 mg. B.A.L. per kg.—J. JONAS.

GINSBURG, M., & WEATHERALL, M. (1948.) **The acute distribution of intravenously administered lead acetate in normal and BAL-treated rabbits.**—*Brit. J. Pharmacol.* **3.** 223–230. **2518**

The distribution of lead in the bodies of rats which had received a dose of lead acetate containing 2·07 mg. of lead per kg. of body weight, and changes in this distribution after the administration of B.A.L. (British Anti-Lewisite) were studied by the use of Pb^{212} (thorium B) as a tracer.

Experimental results are tabulated which indicate that with a few exceptions the distribution of lead when B.A.L. was not given did not alter greatly between the first and 24th hours.

When B.A.L. was administered the content and concentration of lead in the liver, spleen, and bone marrow were consistently reduced, and the excretion of lead in the urine was increased five- or ten-

fold. Increased concentrations of lead were regularly found in the skeletal and cardiac muscle and in the stomach wall.

The observations are consistent with the hypothesis of Weatherall (1948) that B.A.L. acts by preventing the uptake of lead ions by red cells, and indicate moreover that B.A.L. can probably remove lead from cells which have already taken it up.—J. Jonas.

Mani, K. V., Nikolaiczuk, N., & Maw, W. A. (1949.) **Cyanogenetic glucosides and trypsin inhibitors in linseed oil meal.**—*Sci. Agric.* **29.** 91–95. [Authors' summary and conclusions copied *verbatim.*] **2519**

Data obtained on three samples of linseed oil meal indicate that increases in the yield of hydrocyanic acid liberated under incubation were not associated with corresponding decreases in the feeding value of the meals in chick rations. The presence of raw aqueous extracts from linseed oil meal, and from flaxseed which should have contained the trypsin inhibiting factors, had little influence on the tryptic hydrolysis of casein. Autoclaved extracts likewise are without noticeable effect. These findings suggest that trypsin inhibitors are not present in these extracts to any appreciable extent. It is concluded that the observed toxic effect of linseed oil meal in chick rations is due primarily to factors other than cyanogenetic glucosides and trypsin inhibitors.

Cilli, V., & Corazzi, G. (1946.) Ricerche sul veleno di alcuni scorpioni eritrei (*Parabuthus liosoma abyssinicus* e *Pandinus magrettii*) e sulla preparazione di un antisiero specifico. [**Venoms of Eritrean scorpions,** *Parabuthus liosoma abyssinicus* **and** *Pandinus magrettii.* **Preparation of specific antivenenes.**]—*Boll. Soc. ital. Med. Igiene trop.* **6.** 397–406. [Abst. in *Trop. Dis. Bull.* **44.** 846. (1947), copied *verbatim.* Signed: H. Harold Scott.] **2520**

Eritrean scorpions belong to the genera *Buthus*, *Parabuthus* and *Pandinus*. The authors' experiments have been carried out with *Parabuthus liosoma abyssinicus* and *Pandinus magrettii*, and he has studied their actions in mice, rats and guineapigs. The venoms were obtained by E. Sergent's method of grinding telsons in saline, centrifuging and adding glycerin. The m.l.d. of the former (*P.l. abyssinicus*) for mice of 25 gm. weight was 0·4–0·6 cc. (*i.e.* 4/10–6/10 of a telson); of *P. magrettii* 1·0 cc (one whole telson). Death was preceded by staring coat, excitation and dyspnoea, followed by paralysis of the limbs. Post-mortem there was haemorrhagic oedema, gelatinous in character, at the site of inoculation, congestion of viscera and some pulmonary haemorrhages. In rats of about 180 gm., the m.l.d. was 0·5 and 1·0 cc. respectively; in guineapigs (350 gm.) 1·5–2 and 3–4 cc. respectively; the symptoms in both these animals were like those in mice, except that haemoglobinuria was a marked feature also.

The plasma-coagulating power of *P. magrettii* was much greater than that of *P. abyssinicus*; doses which would produce complete coagulation in half an hour in the case of the former would take three hours in the case of the latter. The haemolytic action of *P. magrettii* is marked, but is lacking in *P. abyssinicus*; proteolytic activity is also greater in the case of the former. Thus all three specific effects are greater in *P. magrettii* than in *P. abyssinicus*; nevertheless, the latter, by experiment, is lethal in a smaller dose.

Antivenenes were prepared by injecting donkeys with increasing doses of the venom, but this animal did not prove very satisfactory; better results were obtained from the horse, but even with this the *in vitro* neutralizing potency did not go *pari passu* with *in vivo* protective action.

See also absts. **2449** (alkali treated serum); **2480** and **2481** (agene); **2489** (carbon tetrachloride); **2500** (vitamin D); **2504** (fescue grass), **2570** (poisonous gases).

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Collentine, G. E., Jr. (1948.) **On the efficacy and safety of glycine administered by vein.**—*J. Lab. clin. Med.* **33.** 1555–1562. [Author's summary copied *verbatim.*] **2521**

Glycine plays an important role in the synthesis of body protein, creatine, glycocholic acid, glutathione, uric acid, and heme. It is apparently essential in detoxication and exhibits remarkable versatility in general metabolism. The possibility of depression of glycine synthesis in abnormal states should be recognized.

Blood and urine studies following the intravenous administration of glycine are presented to demonstrate the rapidity of its metabolism and its lack of toxicity even in high blood concentrations. Specific dynamic effect is obtained when it is given by this route.

As an adjunct to the usual parenteral protein therapy, glycine may be administered intravenously with safety and with beneficial effect when oral feeding is not possible.

Collins, H. S., Kraft, L. M., Kinney, T. D., Davidson, C. S., Young, J., & Stare, F. J. (1948.) **Parenteral nutrition. III. Studies on the tolerance of dogs to intravenous administration of fat emulsions.**—*J. Lab. clin. Med.*

33. 143–152. [Authors' summary copied *verbatim.*] **2522**

A 30 per cent fat emulsion stabilized with soybean phosphatides (Asolectin) was given intravenously to dogs with the same ease as the 15 per cent emulsions used in our previous studies. Fat emulsions can be given relatively rapidly to adult dogs. Fat infused into the blood stream caused a prompt and marked increase in plasma fat but normal values were approached in the adult dog within an hour after the termination of the infusion. It appears that the soybean phosphatide used as the stabilizer was primarily responsible for the granulomatous lesions we have observed following the use of intravenous fat emulsions.

SHAW, C. C., BOGER, W. P., CROSSON, J. W., Kemp, W. W., LING, W. S. M., & DUNCAN, G. G. (1947.) **Enhancement of penicillin blood levels in man by means of a new compound, caronamide.**—*Amer. J. Med.* **3.** 206–210. [Abst. in *Bull. Hyg., Lond.* **23.** 280–281. (1948), copied *verbatim.*] **2523**

It has been shown that a new drug, 'Staticin' caronamide, will inhibit the renal tubular excretion of penicillin and thereby elevate the concentration of penicillin in the plasma from two- to seven-fold following the oral and/or parenteral administration of penicillin. Caronamide should be of definite clinical value in the treatment of disease conditions in which high penicillin blood levels are required.

"Caronamide is administered by mouth, usually in doses of 2·0 Gm. every three or four hours, concomitantly with penicillin. Given in these doses, the drug produced no evidence of renal, bone marrow or hepatic impairment, dermatitis or drug fever in this small series of patients."

JONES, P. F., & SHOOTER, R. A. (1948.) **Procaine penicillin: effect of single daily injections.**—*Brit. med. J.* Nov. 27th. 933–934. **2524**

Procaine penicillin G in arachis oil was used in the treatment of 49 human patients suffering from inflammatory diseases, of whom 45 were ambulant. Each ambulant patient received one dose of 300,000 units daily. The highest degree of absorption was not attained until the fourth hour, after which the blood concentration fell so slowly that a therapeutic concentration was present 24 hours after the injection in the majority of cases. On clinical grounds the authors consider that this preparation is superior to penicillin in saline. No local or general reactions due to procaine were seen.—M. R. ORMEROD.

TEMPLETON, H. J., LUNSFORD, C. J., & ALLINGTON, H. V. (1947.) **Cutaneous reactions to penicillin.**—*Arch. Derm., Chicago.* **56.** 325–333. [Abst. in *Bull. Hyg., Lond.* **23.** 61. (1948), copied *verbatim.*] **2525**

Penicillin given by topical application, by oral ingestion or by injection sensitizes a certain percentage of persons. The reactions most frequently seen are contact dermatitis and urticaria. Other reactions occur. Patch tests, scratch tests, intradermal tests and passive transfer each give varying reactions in patients sensitive to penicillin. Because of its ability to sensitize, penicillin should not be used indiscriminately by dermatologists. In general, its use should be avoided in non-infectious dermatoses. When used with an understanding of its limitations and of its dangers penicillin is valuable in the treatment of certain pyogenic infections of the skin.

MANDEL, E. E., & THAYER, J. D. (1948.) **Rectal absorption of penicillin.**—*J. Lab. clin. Med.* **33.** 135–142. [Authors' summary copied *verbatim.*] **2526**

The absorption ratio of penicillin from the rectum is chiefly determined by the method of administration. It is very low after microclysters of penicillin solution, about 6 per cent in the case of cocoa butter suppositories, and subject to wide variations with gelatin capsules. Absorption of penicillin insufflated or applied in cocoa butter capsules into the rectum is equivalent to upper intestinal absorption. The clinical use of the rectal route seems to depend upon ultimate selection of the most suitable vehicle.

JONES, D. (1945.) **The effect of antibiotic substances upon bacteriophage.**—*J. Bact.* **50.** 341–348. **2527**

Some phages, free from their host-cells, were found to be inactivated by streptothricin, streptomycin and clavicin, but not by penicillin or actinomycin. There was no correlation between the susceptibility of the phage and that of the host-cells to the various antibiotics, but it was noted that those antibiotics having a strong effect on Gram-negative organisms were also active against phage.

With concentrations of antibiotic high enough to inactivate the viable cells, the phage added to the mixture was decreased progressively in 24 hours. With lower concentrations phage only multiplied when the cells were multiplying. Phage in the presence of streptomycin-treated host-cells could not be reactivated after incubation.

Using *Staphylococcus aureus* and its phage, it was found that when penicillin was present at concentrations having no destructive effect on the phage, no reduction of phage was produced, but when streptomycin was used a decrease occurred.—R. M. LOOSMORE.

This general account, illustrated by photomicrographs, deals with the morphology, development and pathogenicity of trichinella, and the effect of low temperatures on the parasite.
—T.E.G.R.

SHICHOBALOVA. (1958). **Radioactive radiations for sterilization of meat products infested with larval forms of helminths.** — *Bull. Off. int. Epiz.* **49 bis,** Nos. 11-12 pp. 643-646. [In English.] **3198**

Pieces of muscle from pigs infested with trichinella were irradiated with X-rays (from 1–30,000 r) and with gamma-rays of Co^{60}; they were fed to mice which were killed after various intervals and the effects compared with controls fed non-irradiated infested muscle. In the test mice a lower percentage of larvae remained and started developing in the intestine. The adult worms left the host 2 days after emergence; the males were less resistant than the females, but both were smaller than those in the controls and their development was retarded, a larger proportion of those leaving the host being immature. Sufficient radiation could produce complete sterility in either sex, so that the host developed only the intestinal form of infestation (the severity of which depended on the number of worms and therefore on the radiation dosage). The number of larvae in the muscles varied inversely with the degree of radiation; in one case 5,000 r had produced almost complete sterility. The results with gamma-rays were analogous.—BRENDA M. WILSON.

STEWART, D. F. (1959). **The immune reactions to nematode infestation.**—*Proc. XVIth Int. vet. Congr., Madrid* **1,** 267-278. [Summaries in German and Spanish. Author's summary modified.] **3199**

The literature relating to the mechanisms of resistance of the host to nematode infestation was discussed. A distinction was made between the response of the host to invasive and to non-invasive parasites. Further study might reveal that the effects of the immune response were due to interference with the physiological functions of the parasites.

The serological reactions which take place during self-cure of sheep infested with *Haemonchus contortus* have been investigated by complement-fixation, haemagglutination and the Ouchterlony agar-diffusion precipitin techniques. Attention was drawn to the significance of the third ecdysis of *H. contortus* in relation to the self-cure phenomenon. The main antigenic stimulus was derived from substances released from the larvae during the third ecdysis which takes place in the abomasum. Additional experimental evidence emphasized the local nature of the self-cure reaction.

ROSE, J. H. (1959). *Nematodirus helvetianus*, **an intestinal worm of cattle.**—*Vet. Rec.* **71,** 470-472. [Author's summary modified.] **3200**

Nematodirus helvetianus is briefly described and illustrations are provided for identification of the 4 species of *Nematodirus* recorded from British cattle.

GIBSON, T. E. (1959). **The development of resistance by sheep to infection with the nematodes Nematodirus filicollis and Nematodirus battus.** — *Brit. vet. J.* **115,** 120-123. [Author's summary modified.] **3201**

Experiments on worm-free sheep, aged from 8–89 weeks, showed that sheep over six months of age were resistant to the effects of infestation with *Nematodirus* spp. Although larvae were able to establish themselves in mature sheep their development was inhibited and eventually fewer worms reached maturity than in the susceptible 8-week-old lamb. Previous infestation appeared to convey no significant immunity. G. discussed these findings in relation to the control and epidemiology of nematodiriasis.

GIBSON, T. E. (1959). **The survival of the free-living stages of Nematodirus spp. on pasture herbage.** — *Vet. Rec.* **71,** 362-366. [Author's summary modified.] **3202**

The fluctuations in the numbers of *Nematodirus* larvae on pasture herbage were studied from November 1955 to August 1958. Differences in the level of infestation with *N. battus* and *N. filicollis* are referable to the different rate at which the eggs of these two species develop. The spring peak of pasture larval infestation, which is responsible for epidemics of nematodiriasis, is referable to mass hatching of overwintering eggs and appears to be caused by the spring rise in temperature. Although a pasture may be heavily infected with larvae after mass hatching of the eggs in spring, the larvae of both species are short-lived and the pasture will be free from infestation the following year when it may safely be grazed by lambs.

GORDON, H. McL. (1958). **The effect of worm parasites on the productivity of sheep.** — *Proc. Aust. Soc. Anim. Prod.* **2,** 59-68. **3203**

G. gives detailed reports of experiments with sheep which show the adverse effects of helminthosis on appetite, growth and fattening, wool quality and quantity, and milk production. The effects of heavy infestations are spectacular

but in the aggregate serious outbreaks are uncommon. The more insidious effects of lighter infestations may not be recognized unless precise measurements are made. Parasitic diseases are a source of serious economic loss and can seriously interfere in field trials with grazing animals.—R. I. Sommerville.

Ivachkine, V. M. (1958). La parabronématose une nouvelle helminthose des ruminants. Epizootologie, prophylaxie, élucidation du cycle évolutif de son agent. [*Parabronema skrjabini* **infection of animals.**] — *Bull. Off. int. Epiz.* **49 bis,** Nos. 11-12 pp. 353-360. **3204**

The nematode, *Parabronaema skrjabini,* affects large and small ruminants, including *Gazella gutturosa, G. subgutturosa* and *Saiga tatarica.* It is widespread in semi-desert regions and in the steppes. It occurs in the abomasum, where it penetrates the mucosa, causing gastritis, weakness, loss of weight and even death. The parasite (whose life cycle is described) has an intermediate host, *Lyperosia titillans.* Infestation occurs at pasture, through ingestion of infested lyperosia imagos, from mid-July to mid-August. The parasites may survive in the definitive host for up to 15–19 months. Phenothiazine, by the mouth, is considered effective in prevention and treatment.—T.E.G.R.

Schanzel, H. (1959). O zależności między wiekiem owiec a inwazją nicieni płucnych. **[Relationship between age of sheep and lungworm infestation.]** — *Med. Wet., Warszawa* **15,** 79-81. [In Polish. Summaries in German and Russian.] **3205**

S. examined lungs of 118 slaughtered Merino sheep (all from one flock) comprising 63 yearlings and 55 adults. The extent of infestation with *Dictyocaulus filaria* and *Protostrongylus kochi* was the same in both age groups. Twice as many adult *D. filaria* were found in the lungs of young sheep as compared with the adults but the number of *P. kochi* was 33% higher in the lungs of adults. In another group of 42 yearlings and 68 adults (5–6 years old) the intensity of *Muellerius capillaris* infestation was 6½ times higher in the adult sheep. S. considers that the resistance of adult sheep to *P. kochi* is not lowered, but since members of the subfamily Protostrongylidae can live for several years the number of these parasites in sheep lungs is cumulative.—M. Gitter.

Beaver, P. C. (1959). **Visceral and cutaneous larva migrans.**—*Publ. Hlth Rep., Wash.* **74,** 328-332. **3206**

B. discussed the occurrence of *Ancylostoma braziliense* larvae under the skin and *Toxocara canis* larvae in the viscera of human beings. He suggested that more surveys of the incidence in dogs and cats were needed to assist epidemiological investigations.—R.M.

Gil'denblat, A. A., Potemkin, V. I. & Pavlova, N. V. (1959). **[Chlorophos as an anthelmintic.]**—*Trud. Mosk. vet. Akad.* **27,** 91-95. [In Russian.] **3207**

Chlorophos [*O,O* dimethyl-2,2,2-trichlor-1-oxyethylphosphonate or Dipterex] was not toxic for calves or sheep when inj. s/c at 15–25 mg./kg. body wt. as a 10–15% aqueous soln., nor for dogs when given by mouth at 40–100 mg./kg. It had no anthelmintic action against lungworms in 3 sheep, liver fluke in 2 heifers and 4 sheep and trichostrongyles in 3 heifers and 4 sheep, but was effective against ascarids in 4 dogs and against *Passalurus ambiguus* in 3 rabbits when given by mouth at 40–50 mg./kg. body wt.—R.M.

Blake, C. D. (1958). **A turbidimetric method for estimating the number of nematode larvae in a suspension.**—*Proc. Linn. Soc. N.S.W.* **83,** 241-244. **3208**

Using a modified Peter's counting chamber, a standard curve was constructed relating the logarithm of absorption and the number of nematodes in the suspension. For *Anguina agrostis* (Steinbuch), the error in the prediction from the standard curve was less than 5%.
—R. I. Sommerville.

See also absts. **3093** (helminths and bacterial infections); **3281** (pharmacology of phenothiazine).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Lombard, L. S. & Witte, E. J. (1959). **Frequency and types of tumors in mammals and birds of the Philadelphia Zoological Garden.** —*Cancer Res.* **19,** 127-141. **3209**

An increased frequency of neoplasms between 1935 and 1955, compared with 1901–1934, was partly attributable to longer life of captive wild animals due to better care. In primates, carnivores, artiodactyls and birds, epithelial neoplasms were much more numerous

CLAUBERG, K. W. (1947.) Neue Wege der Desinfektion mit zwangsläufig geführtem Dampf in Verbindung mit strömender Heissluft unter Verwendung des TCP-Einheitsgerätes. [**A new method of disinfection by combining steam under pressure with hot air in the TCP apparatus.**]—*Z. Hyg. InfektKr.* **127.** 123–129. [Abst. from abst. in *Bull. Hyg., Lond.* **24.** 69. (1949.) Signed: V. D. ALLISON.] **2538**

The application of a new method of disinfection is described, in which the TCP hot-air machine has been adapted in the form of a special model to meet the disinfection needs of isolation hospitals by combining hot-air with steam under pressure. The original machine is operated by hot air forced under pressure at high speed through narrow channels whereby clothing to be disinfected rapidly and uniformly reaches the required temperature throughout. The practical result of tests in the modified model is to shorten the time of disinfection to a fraction of that needed by current methods. The actual sterilization process generally takes not more than three minutes, including an extra time allowance as safety margin. Increased economy, less damage to materials, avoidance of unpleasant odours and absence of steam are additional advantages.

[Trials do not appear to have proceeded beyond tests with a model apparatus.]

BIGG, E., JENNINGS, B. H., & OLSON, F. C. W. (1947.) **Triethylene glycol vapor distribution for air sterilization.**—*Heat. Pip. Air Condit.* **19.** 103–107. [Abst. in *Bull. Hyg., Lond.* **22.** 531. (1947), copied *verbatim*. Signed: T. BEDFORD.] **2539**

These authors have previously discussed the use of glycol vapours for air sterilization and the control of air-borne infections. The present paper describes apparatus for the production of triethylene glycol vapour and its distribution in ducts for air disinfection in a large building, and it gives a short account of a controlled experiment in an army training camp.

Air disinfection was carried out in a large building, 360 ft. wide and 600 ft. long, which was partitioned off into 105 rooms. Some of these partitions extended from floor to roof, but most of them only extended to a height of 14 feet from the floor, leaving a gap between the top of the partition and the saw-tooth roof. The building was heated by steam radiators and unit heaters. Seven ducts were installed for the distribution of the glycol vapour, and each duct had a vaporizer and a high-pressure plenum fan. The duct systems handled only recirculated air. Details of the construction and operation of the vaporizers are given in the paper: the output of glycol was closely controlled. The outlets from the duct were small moulded ceramic fittings placed at 9-ft. intervals. These delivered the glycol vapour to the upper parts of the rooms, where it was distributed fairly uniformly throughout the rooms. Weather conditions and constructional features of the building caused noticeable variations in the concentrations of vapour. Under certain conditions, some of the vapour escaped through roof windows before it could be dispersed towards the floor. When down-draughts occurred there was a " build-up " of vapour near the floor.

The study of the effects of glycol disinfection on the incidence of respiratory disease was made on two squadrons, each of about 500 men. In the pre-test period of 8 weeks in December 1945 and January 1946, the respiratory disease rates in the control and test groups were respectively 262 per 1,000 per annum, and 272 per 1,000. During the next 10 weeks (January 25th to April 6th) when glycol vapour was used, the disease rate for the control group was 714 per 1,000 per annum, and that for the test group only 384 per 1,000. Thus, the men in the barracks where glycol vapour was used had 46·2 per cent. less respiratory disease than occurred in the control group. The medical and epidemiological aspects of this study are to be dealt with in a later paper.

WILSON, I. B., & LAMER, V. K. (1948.) **The retention of aerosol particles in the human respiratory tract as a function of particle radius.**—*J. industr. Hyg.* **30.** 265–280. [Abst. in *Bull. Hyg., Lond.* **24.** 137. (1949), copied *verbatim*. Signed: C. N. DAVIES.] **2540**

Aerosols of nearly uniform particle size were formed from glycerol by vaporization in a special apparatus. Each particle contained a trace of radioactive sodium Na^{24}. The glycerol droplets were passed over 50–50 glycerol water solution so as to bring their composition to the same proportion. It is shown that subsequent change of size of such droplets by the absorption of additional water while traversing the human respiratory tract can be neglected. By adjusting the aerosol generator, the drop size could be varied from 0·2 micron to 2·6 micron radius. The size was checked during each experiment by three different methods.

A number of subjects inhaled the aerosols, and measurements were made from which it was possible to deduce the total quantity retained in the respiratory tract and also the amount in the alveoli.

The observations consisted of β and γ ray activity determinations with a Geiger counter. The total retention was estimated from the deposit in filters through which measured volumes of inhaled and exhaled air had been drawn. To find the alveolar retention the counter was screened

with a lead shield containing a slot. It was placed against the chest wall, in the axillary region, with the slot horizontal and cutting across the fifth rib. The β radiation was absorbed by the body, but the γ rays penetrated and could be counted. Since the counter was shielded from the direction of the upper respiratory tract and was remote from the larger air spaces, the radiation picked up came predominantly from the peripheral portion of the lung near the chest wall. These observations gave information about the relative retention in the alveoli as a function of particle size ; to gauge the absolute retention additional measurements were made of count frequency from a standard source and also of counts from blood samples.

The experimental results for total retention, P, are expressed as follows :–

$$P = 105r^{0.163} - (0{\cdot}237 - 0{\cdot}029r)\,R$$

where r is the particle radius in microns and R is the frequency of respiration in cycles per minute. Apparently the volume inhaled was not measured, though it was noticed that deep inspiration, followed by a brief pause before exhalation, caused a greater retention of small particles. The alveolar retention exhibits a maximum with two peaks in the range 0·3 to 1·0 microns radius. The maximum alveolar retention is considered to be about 45 per cent. of the inhaled aerosol.

See also absts. **2351-2354** and **2358** (penicillin and staphylococci) ; **2361** (penicillin and anthrax) ; **2366-2377** (TB.) ; **2385** and **2386** (swine erysipelas) ; **2388** (sulphamethazine) ; **2389** (fowl cholera) ; **2398** (brucellosis) ; **2402** (tetanus) ; **2421** (trypanosomiasis) ; **2423** (coccidiosis) ; **2425** (malaria) ; **2428** (pox diseases) ; **2440** (distemper) ; **2445** (typhus) ; **2451-2453** (parasiticides) ; **2461-2465** (D.D.T.) **2468** ; (phenothiazine) ; **2472-2474** (anthelmintics) ; **2517** and **2518** (BAL) ; **2548** (sulphonamides).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

DE NÓ, R. L. (1947.) **A study of nerve physiology. Part 1 & Part 2.**—*Stud. Rockefeller Inst. med. Res.* **131.** 1–496 ; & **132.** 1–548. **2541**

I & II. In this comprehensive study of the transmission of nerve impulses, the problem has been approached from the point of view that as nerve fibres are core conductors, the mathematical theories which have been applied so successfully to study the behaviour of inert core conductors would provide physiologists with a new means of studying the behaviour of nerve fibres.

Some of the main findings of this work are that the nerve fibre is a self-contained mechanism and it is the oxidative metabolism which creates the resting membrane potential. This is not dependent on the ratio of the concentration of K^+ ions inside and outside the nerve fibre. The nerve impulse is not simply a disappearance of the resting electromotive forces but arises as the result of an alteration in the nerve fibre which establishes new electromotive forces. This alteration is of brief duration and the action potential so created may be less than the resting potential, and has a sign opposite to the latter. No distinction can be drawn between chemical and electrical processes in nerve fibres, but it remains to be determined in detail which of the electro-chemical reactions establish the resting potential and which of them produce the alteration giving rise to the action potential.—J. A. NICHOLSON.

MOUSTGAARD, J. (1947.) **On the physiology of the kidneys.**—*Maanedsskr. Dyrlaeg.* **59.** 33–50. [In English.] **2542**

In this general review of kidney activity, M. points out that an extraglomerular circulation is now known to exist which must be taken into account in any study of kidney function. Clearance studies have shown that substances eliminated from the blood by tubular secretion, combine with a component in the tubular cells to form a complex which is then degraded, the extraneous substance being excreted and the component retained for further use. Experimental evidence suggests that the same component is used in the excretion of a variety of substances, the practical significance being that the excretion of such substances as penicillin can be partially blocked by the simultaneous administration of another substance *e.g.* *p*-amino-hippuric acid which competes for the component.

Following nephrectomy there is a decrease in renal function, but compensation is provided by a higher filtration pressure in the glomerular capillaries or by an extended area of filtration. Kidney activity is influenced not only by the pituitary hormones but also by the adrenals, adrenalectomy being followed by degenerative processes in the tubular cells with a failure of absorption of Na ions. Sex hormones also exercise a renotrophic effect. In the dog they increase the secretory capacity of the kidneys without affecting the filtration or renal blood flow. Castration causes a wasting of the renal tissue and a decrease of phosphatase activity of tubular cells.

—J. A. NICHOLSON.

BUCHANAN, A. R., & HILL, R. M. (1949.) **Myelination of the hypothalamus and its relation to thermoregulation in the hamster.**—*Proc. Soc. exp. Biol., N.Y.* **71.** 126–129. [Authors' summary copied *verbatim.*] **2543**

Hamsters acquire the ability to effectively regulate their body temperatures in a cold environment (5°–8°C) at ages ranging from 30–44 days. Myelination in the dorsolateral areas of the caudal hypothalamus, as determined photometrically, reaches its height at the time thermoregulation

becomes fully developed. It appears therefore that myelination of hypothalamic neurons may be essential to functional maturation of the hypothalamus. The data with respect to hamsters are similar and lend support to those previously reported for albino rats.

STOWELL, R. E. (1948.) **Nucleic acids and cytologic changes in regenerating rat liver.**—*Arch. Path.* **46.** 164–178. [Author's summary and conclusions copied *verbatim.*] **2544**

The changes in cellular structure and nucleic acid concentration were correlated during the first two days of regeneration of rat liver. Within the first six hours of regeneration there was an increase in the visible cytoplasmic lipids and in the volume of the cytoplasm, nucleus and nucleolus with a decrease in the sinusoidal space. By 18 to 24 hours the mean volumes of the cytoplasm, the nucleus and the nucleolus had increased 2·6, 2·2 and 4·1 times, respectively. Following an increase in cell division at 24 to 30 hours, there was a decrease in the mean volume of each of these cellular constituents. At 48 hours' regeneration the mean nuclear and cytoplasmic volumes were still considerably above normal, while the mean nucleolar volume was less than normal. In normal livers the nuclear volumes constituted two main groups with mean ratios of approximately 1 to 2. This evidence of normal polyploidy tended to disappear in the second day of regeneration.

Ultraviolet cytochemical observations indicated little change in nucleic acid concentration during the first 24 hours, but during the second day the synthesis associated with the rapid cell division was accompanied by an increase of nucleic acid concentration in the cytoplasm adjacent to the nucleus and also in the nucleolus. The results indicate that the morphologic aspects and the chemical composition of the nucleolus and of the cytoplasm are greatly altered in different phases of growth in regenerating hepatic cells.

VINCENT, W. S., & DORNFELD, E. J. (1948.) **Localization and role of nucleic acids in the developing rat ovary.**—*Amer. J. Anat.* **83.** 437–457. [Authors' summary and conclusions copied *verbatim.*] **2545**

Some 50 ovaries of 33 albino rats ranging in age from 4 days before to 60 days after birth were studied cytochemically for the localization of nucleic acids. The principal methods used were the Brachet ribonuclease test for ribonucleic acid and the Feulgen technique for desoxyribonucleic acid.

The typographic relationships of the developing ovary to the oviduct, fimbria, ligaments, capsule, and blood supply are reviewed.

The proliferation of oöcytes from the germinal epithelium is confined to restricted zones which are in close contact with rapidly growing regions of the oviduct and fimbria. These regions possess a high content of ribonucleic acid. On the basis of various experiments reported by other workers, showing the stimulating effect of ribonucleic acid on growth and evocation, it is suggested that an extraneous source of this acid, probably from the adjacent oviducal tissue, is causally related to the germinal proliferation.

With growth of the oöcysts the desoxyribonucleic acid content of its nucleus becomes reduced and a perinuclear band of ribonucleic acid is developed in the cytoplasm. The nucleoli become strongly basophilic and are shown to possess a core of ribonucleic acid and a shell containing desoxyribonucleic acid that is apparently bound with some other basophilic substance impermeable to ribonuclease and itself unaffected by this enzyme. During the early development of the oöcyte the organization of the primary follicle is attributed to evocating action of ribonucleic acid from the oöcyte.

The developing granulosa shows a marked content of ribonucleic acid that is highest in the innermost and outermost rows of cells. In follicular atresia an intense accumulation of desoxyribonucleic acid occurs in the pycnotic granulosa nuclei. The possible relation of this to the abortive maturation and cleavage of the oöcyte and to the thecal enlargement is discussed.

Atresia of young oöcytes in germinal nests is shown to occur during meiotic prophases. This is considered in the light of the relationships between low oxidative and ribonucleic acid levels during this period. After the onset of atresia, degeneration is accompanied by transformation of desoxyribonucleic acid to ribonucleic acid.

DAVIES, O. L., & HURST, E. W. (1948.) **Studies on the blood-brain barrier. I. The basis of dosage for animals of various weights.**—*Brit. J. Pharmacol.* **3.** 309–314. **2546**

With a view to determining whether a uniform basis of dosage exists, for mice of dissimilar weight, of drugs penetrating the blood-brain barrier, the authors used intravenously three convulsant drugs—cocaine, strychnine, and picrotoxin and compared the dosage-mortality curves. They also estimated chemically the amount of sulphanilamide passing into the brain. Dosage on the basis of brain weight results in giving too large amounts of the drug. The correct basis of assessment of dose is by body weight.—W. R. B.

AMBACHE, N., MORGAN, R. S., & WRIGHT, G. P. (1948.) **The action of tetanus toxin on the rabbit's iris.**—*J. Physiol.* **107.** 45–53. **2547**

The injection of small quantities of tetanus

toxin into the anterior chamber of a rabbit's eye is followed in 1–2 days by dilation of the pupil and a loss of reaction to light, the effect persisting for several weeks. The reaction may be prevented by antitoxin, but still occurs after division of the sympathetic nerves to the iris. It is not due to paralysis of the *sphincter pupillae* muscle fibres as the iris still responds to acetylcholine. Stimulation of the oculo-motor nerve, however, has little or no effect on the pupil of the toxin-injected eye which suggests that the toxin specifically paralyses cholinergic nerve-endings.—J. A. Nicholson.

Shuhardt, V. T., Carroll, T. B., Rode, L. J., & Lacy, H. (1948.) **The permeability of the lactating bovine mammary gland to sulfonamides.**—*Amer. J. vet. Res.* **9.** 144–146. **2548**

To investigate the possible existence of a tissue factor affecting the permeability of lactating bovine mammary gland, experiments with sulphonamides were carried out on 18 Jersey cows. The drugs selected were sulphanilamide, sulphamerazine, sulphathiazole, sulphapyrazine, sulphapyridine, sulphadiazine, 2-sulphanilamido - 5 - bromopyrimidine, and 2-sulphanilamido-5-chloropyrimidine. Three 30 g. doses of each drug were given *per os* in capsules at intervals of four hours. Blood and milk samples were taken at 6, 10, 22, 34 and 46 hours after beginning treatment. Only sulphanilamide and sulphapyridine permeated the mammary gland in therapeutic concentration and, of the two, sulphapyridine reached higher levels in both milk and blood. Of the other sulphonamides, only sulphamerazine permeated the gland, but at much lower level than in the blood. Acetylated forms of each drug appeared in the milk, particularly with sulphanilamide. From these results it appears that only sulphapyridine and sulphanilamide are of therapeutic value in treating affections involving the udder.—M. R. O.

Gordon, I. (1948.) **Specific gravity of the blood corpuscle.**—*Arch. Path.* **46.** 97–106. [Author's summary and conclusions copied *verbatim.*] **2549**

The long-established theory that white corpuscles move from the axial to the peripheral stream of the blood by virtue of their lower specific gravity is reviewed in the light of the work of Fahreus and Vejlens in which this process is denied. It is pointed out that as nearly half of the volume of the blood consists of red blood corpuscles, and as these corpuscles move with differing velocities according to their distances from the intima, a series of collisions must ensue when erythrocytes or erythrocyte clumps overtake leukocytes. The result of these collisions is to force the leukocytes into the peripheral stream. The mass of the corpuscle, which is the product of its volume and specific gravity, and the relative velocities of the corpuscles concerned, are the main relevant factors that decide to what extent this " bouncing out " will occur. Evidence is brought forward to the effect that the lipophage will have a specific gravity less than that of other leukocytes, and perhaps even less than that of plasma. The velocities are considerably reduced in the large elastic arteries during diastole, and in the slow peripheral zone and adjacent portions of the axial stream gravity may also have some influence in bringing these lipophages into contact with the intima, facilitating their entrance therein and so producing the earliest lesion of atheroma.

Pomerat, C. M., Jacobson, W., & Orr, M. F. (1949.) **A macrophage-promoting factor (MPF) in the blood of rabbits.**—*Amer. J. Anat.* **84.** 1–26. [Authors' summary copied *verbatim*] **2550**

The present study is concerned with the capacity of blood serum from " normal " rabbits to promote the formation of large numbers of macrophages in explants of spleen from 18-day chick embryos. When incubated at 37·0°C. for 18 hours, such cultures show that all outwandering myelocytes have been phagocytosed. Evidence is presented to show that a macrophage-promoting factor (MPF) which is present in varying degrees in the blood of rabbits is thermolabile, insoluble in absolute alcohol or acetone, and soluble in Tyrode after precipitation in 1/3 saturated ammonium sulfate. Under the test conditions described, it was not found possible to reproduce the macrophagic reaction *in vitro* by the addition to the medium of sera from animals known to have or to be free from the Forssman antigen or by anti-organ sera with high or low complement-fixation or hemolytic titres. Negative results were also obtained with various concentrations of histamine, 17-hydroxy-11-dehydrocorticosterone, choline, or various quaternary ammonium compounds. It is believed that the macrophage-promoting factor (MPF) is not identical with leucotaxin, the leucocytosis-promoting factor, necrosin, pyrexin, or the leucopenic factor described by Menkin.

Majumder, D. N., & Wintrobe, M. M. (1948.) **Anemia of infection. IX. Influence of adrenalectomy and of adrenal cortical hormone on hypoferremia and other blood changes associated with injection of turpentine.**—*J. Lab. clin. Med.* **33.** 532–541. [Authors' summary and conclusions copied *verbatim.*] **2551**

A series of one hundred twenty-eight albino rats was used in this study. Of these, twenty-one served as normal controls, forty-five received injections of turpentine in two separate groups in doses of 0·5 and 0·1 ml., respectively, while twenty were injected with adrenal cortical extract. Of the remaining forty-two, which were

all adrenalectomized, fifteen served as controls, twenty-four received 0·1 ml. and three 0·5 ml. of turpentine. Plasma iron, hemoglobin, total and differential white cell counts were determined in these animals. Information regarding the original data has been condensed into a number of tables and the significance tested.

The following conclusions have been reached: The adrenal gland has no effect on the normal level of plasma iron in rats, nor does it affect the hypoferremia which results in these animals from turpentine injection. The adrenal gland may, however, be related in some way to the quick recovery from hypoferremia induced by the injection of turpentine. The adrenal gland does not seem to have any influence on the maintenance of the normal hemoglobin level in rats, though under conditions of stress, such as turpentine injection, it may play some role in preventing a drop in the level of hemoglobin that might otherwise occur. The adrenal gland is intimately concerned with the peripheral leucopenia that follows turpentine injection in normal rats. This leucopenia involved both lymphocytes and granulocytes and was not observed in adrenalectomized rats.

FRIEDMAN, S. M., POLLEY, J. R., & FRIEDMAN, C. L. (1948.) **The effect of desoxycorticosterone acetate on blood pressure, renal function, and electrolyte pattern in the intact rat.**—*J. exp. Med.* **87.** 329–338. [Authors' summary copied *verbatim.*] **2552**

Small doses of DCA administered at intervals in pellet form are capable of raising the blood pressure, altering renal function, and changing the electrolyte pattern in the intact rat. The concomitant feeding of 1 per cent saline intensifies the process.

The elevation in blood pressure occurs prior to demonstrable changes in renal excretory function.

The alteration in renal function consists first of a reduction in C_{PAH} with the maintenance of a normal filtration rate. Filtration fraction is elevated while there is no reduction in renal plasma flow per unit of tubular excretory tissue. Later, filtration is interfered with and renal ischemia occurs.

The electrolyte change is characterized by a sustained fall in plasma K and Cl, a rise in plasma Na, an increase in the Na/Cl ratio, and finally an elevation of Na plus K. Plasma Ca is unaffected.

These observations suggest the possible etiological significance of the adrenal cortex in some types of hypertension.

DOGIEL, V. (1947.) **The phylogeny of the stomach-infusorians of ruminants in the light of palaeontological and parasitological data.**—*Quart. J. micr. Sci.* **88.** 337–343. **2553**

The infusoria of the ruminant stomach belong to the family Ophryoscolecidae. They enter the stomach by direct contact, cysts being unknown, and have been found in all branches of the ruminant family so far examined, *i.e.*, Camelidae, Cervidae and Bovidae.

A comparison of the distribution of the different members of the group with the palaeontological occurrence of their hosts, suggests that the Ophryoscolecidae arose at different periods, the more complicated ones appearing later than the simpler forms. The former have specialized feeding habits on cellulose particles, but the latter have a more diversified diet.—J. A. NICHOLSON.

HAIMOVICI, H. (1948.) **Evidence for an adrenergic component in the nervous mechanism of sweating in man.**—*Proc. exp. Biol., N.Y.* **68.** 40–41. **2554**

In man the fact that the sweat glands, although under the control of the sympathetic nervous system, respond to parasympathetic drugs has long been a puzzle. In experiments with dibenamine (a new adrenergic-blocking agent) sweating was inhibited. In discussing these results H. states that in horses and in sheep epinephrine induces marked sweating while in man it fails to do so; he concludes that in addition to the cholinergic fibres in the nerves supplying the sweat glands there is also an adrenergic component in the nervous mechanism of sweating in man. [These findings may be of interest in connexion with the problem of anhidrosis ("dry-sweating") in horses.]—M. C.

NILSSON, S. A. (1948.) Bidrag till kännedomen om fotens innervation hos häst. **[The nervous system of the foot in the horse.]**—*Skand. Vet-Tidskr.* **38.** 401–460. [Abst. from English summary.] **2555**

The innervation of the foot of the horse was investigated in 22 horses by means of gross dissection and histological examination of normal and neurectomized nerves.

The result of this most comprehensive study indicates a pattern of distribution of branches of the plantar nerve in both limbs at slight variance with the usual text-book description; gives details of the number and size of nerve bundles of the main nerves and their branches at all levels and an appreciation of the supply to structures within the hoof; and enabled N., following neurectomies and staining by Marchi or Weigert-Pal, to map out the area of supply of the main branches in the superficial and deep areas of the fetlock and foot.—C. W. OTTAWAY.

KADLETZ, M. (1948.) Die anatomischen Grundlagen der "Oberlinie" (Rückenlinie i.w.S.) des Hundes. **[Morphology of the back of the dog.]**

—*Dtsch. tierärztl. Wschr.* **55.** 343–346, & 355–360. **2556**

Taking as his fixed points the elbow joint, the last lumbar vertebra and the poll, K. analysed the contour of several breeds of dog relating their particular form to the requirements of locomotion and the position of the centre of gravity. The triangle formed by these three points is subdivided into areas determined by the lengths of regions of the vertebral column for further analysis. As a purely mechanical conclusion it can be said that the height of the withers can be correlated with the length and inclination of the neck. The Airedale terrior is cited as a breed with good symmetry. The findings are discussed from the points of view of the anatomist and of the artist.—C. W. Ottaway.

Opie, E. L. (1948.) **An osmotic system within the cytoplasm of cells.**—*J. exp. Med.* **87.** 425–442. [Author's conclusions copied *verbatim.*] **2557**

The cytoplasm of cells of the liver and of the kidney is in large part occupied by bodies which respond to the water content of these cells and are modified by dissolved substances in the surrounding fluid or by physical change such as freezing.

These bodies, in part mitochondria but designated more broadly cytochondria, constitute an osmotic system within the cytoplasm of cells.

When the specific gravity of liver or kidney tissue is used as an index of changes in the water content of tissue, swelling of cytochondria in general follows the intake of water but this relation may be modified by a variety of conditions.

When liver that has been frozen and thawed is immersed in water, cytochondria become swollen though the containing cells diminish in size.

Solutions of sodium and of potassium chloride isotonic with blood plasma cause delayed swelling of cells and cytochondria, greater with the potassium salt; solutions of calcium chloride of equal molar concentration cause immediate swelling of cells and cytochondria.

The basophile material of the cytoplasm (ribonucleic acid and related substances) and the material that gives to mitochondria their characteristic stain are removed by immersion in water but their disappearance is retarded by isotonic solutions of sodium or of potassium chloride and further delayed by hypertonic solutions.

When the intensity of staining reactions is diminished by the partial loss of basophile substance or of the distinctive mitochondrial material, these are found at the surfaces of the cytoplasmic bodies, held perhaps by adsorption.

When water, isotonic solutions of sodium chloride, or Ringer's solution comes into contact with immersed liver, they remove basophile and mitochondrial material from a superficial zone and substances with similar staining reactions appear in the cytoplasm of cells at a deeper level.

Osmotic changes in the cytoplasmic bodies may be reversible. When liver tissue which has been for a short time immersed in water is transferred to a solution that is approximately isotonic in relation to blood plasma, swollen cytochondria return in part or completely to their former size; but with continued immersion in water, this reversibility becomes increasingly less complete.

Gross, J., & Schmitt, F. O. (1948.) **The structure of human skin collagen as studied with the electron microscope.**—*J. exp. Med.* **88.** 555–568. [Authors' summary copied *verbatim.*] **2558**

The structure of the collagen fibrils of normal human skin corium has been investigated with the electron microscope.

Under the conditions of observation the fibrils ranged in width from about 700 to 1,400 A with 1,000 A as the value occurring most frequently. They showed little tendency to fray longitudinally as is characteristic of tendon fibrils; when fracture of fibrils occurred it was usually in planes transverse to the axis.

The axial repeating periods observed in fibrils stained with phosphotungstic acid or shadowed with chromium or platinum range from about 500 to 800 A, the maximum occurring between 620 and 660 A. The average period in fibrils from infant skin does not differ significantly from that of adult and aged skin.

Depending on conditions of preparation, intraperiod fine structure, in the form of cross-bands, was observed in varying detail. The most detailed pattern commonly observed contains six bands of characteristic density and position.

Shadowed plastic replicas of dried collagen fibrils reproduce much of the structure commonly seen in shadowed fibrils. Replicas of moist fibrils show considerably less surface contouring than do dried fibrils. Replicas from smears of connective tissue fragments on glass show detailed structure, indicating the feasibility of applying this technique to biopsy material.

Infant skin differs from adult skin in having considerably greater amounts of amorphous material, little of which is strongly adherent to the collagen fibrils.

Palay, S. L., & Claude, A. (1949.) **An electron microscope study of salivary gland chromosomes by the replica method.**—*J. exp. Med.* **89.** 431–438. [Authors' summary copied *verbatim.*] **2559**

A method for preparing replicas of salivary

gland chromosomes for electron microscopy is described.

Electron micrographs of these replicas show that the giant chromosomes are composed of a series of small granules of approximately equal size arranged transversely across the chromosome.

In stretched preparations a linear network of filaments appears between the rows of granules. These fibers cannot be traced between corresponding granules of more than two consecutive rows. When the chromosomes are digested by desoxyribonuclease, these fibers disappear and only amorphous material remains between the bands. The characteristics of the strands suggest that they are artifacts produced when the chromosomes are stretched.

The small granules are composed of desoxyribonucleic acid and at least one other component, probably a protein. The nucleic acid seems to lie at least in part on the surface of each granule.

See also absts. **2502** and **2503** (lactation); **2584** (heat regulation); **2611** and **2612** (technique).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

BROOKE, M. S. (1947.) **Milk standards and milk safety: a critical analysis in relation to Glasgow's milk supply.**—*Glasg. med. J.* **28.** 378–386. [Abst. in *Bull. Hyg., Lond.* **23.** 197. (1948), copied *verbatim.* Signed: W. G. SAVAGE.] **2560**

The author explains briefly the legal position in Scotland and the different types of designated milks authorized.

In Glasgow, most of the milk is produced in the surrounding counties and of these Ayrshire has the greatest number of tuberculin-tested herds of any county in Britain, *i.e.*, 81·6 per cent. Of this milk, a steadily increasing proportion is pasteurized, but about 5,000 gallons daily from non-licensed herds are sold without any form of heat treatment. The incidence of tubercle bacilli in samples of this raw milk from 1937 to 1945 varied from 0·96 to 6·80 per cent.; for 1944 and 1945 the figures were 5·45 and 3·70. The percentage incidence of tubercle bacilli in the milk entering Glasgow from producers during the last 10 years was 8·18 (1937), 5·13, 9·39, 6·30, 5·98, 5·74, 5·45, 3·58, 1·30, 2·70 (1946). It is only during 1945 and 1946 that there was a marked decline and this the author ascribed to the recent great increase in the number of tuberculin-tested and certified herds.

Since 1937, a total of 1,192 samples of pasteurized milk were examined by animal inoculation and all failed to show viable tubercle bacilli. Phosphatase tests were not so satisfactory, but details are not given.

Attention is drawn to the fact that much of the Glasgow milk is heated not once, but several times, in order to improve its keeping qualities; the author deprecates this practice.

Regarding cleanliness, a table showing the number of examinations of ordinary market milk which gave counts over 200,000 per ml. and those with coliform organisms present in 1/100 ml. each year indicates comparatively little improvement between 1938 and 1946.

The author mentions that in Glasgow during the past twelve years outbreaks of Flexner dysentery (1940), diphtheria (1936), typhoid fever (1936) and paratyphoid fever (1937) have been traced to milk.

DAVIS, J. G. (1948.) **The cleansing and sterilizing of dairy and ice-cream plant.**—*J. R. sanit. Inst.* **68.** 547–556. **2561**

The excellence of milk as a medium for bacteria makes cleaning and sterilization of equipment the two most important operations in dairy practice. In cleaning the removal of all milk and other residues, particularly "milk stone" and "yellow slime" is important. Details of the cleaning and sterilization are discussed.

A discussion of dairy equipment follows. In an investigation made by the National Institute for Research in Dairying it was found that in a small proportion of cases milk produced apparently under very adverse circumstances never failed in any test, whereas milk produced from very well-equipped and up-to-date farms frequently failed. The former type of farm invariably had a copious supply of clean, cold water and the utensils were kept scrupulously clean.

The treatment of churns, tanks, pipe-lines, pasteurizing plants and bottles is described; reference is made to difficulties caused by the use in the home of milk bottles for improper purposes, paraffin, paint, cement, flowers in cemeteries, etc.

The effect of atmospheric temperatures on the bacteriological condition of utensils and plant is important.

In general the use of wooden equipment is condemned, even although in certain cases it is kept scrupulously clean. D. concludes with four tables:– (1) the advantages and disadvantages of steam and chlorine as sterilizing agents, (2) summary of standard methods; (3) summary of characteristic problems associated with specific plant, etc., and (4), the principal properties of common detergent constituents.—D. S. R.

MORRIS, C. S., & EDWARDS, M. (1947.) **High colony counts in pasteurized milk caused by**

bacteria from efficiently sterilized plant.—*Proc. Soc. Applied Bact.* No. 1. pp. 21–23. [Abst. in *Bull. Hyg., Lond.* **23.** 540. (1948), slightly modified. Signed: W. G. SAVAGE.] **2562**

Samples taken from one pasteurizing plant were found consistently to have colony counts (37°C. for 48 hours) of the order of 10 million per ml. when tested after ageing at 18°C. for 24 hours. These were found to be due not to faulty sterilization but to certain organisms which are able to proliferate very rapidly in pasteurized milk at 18°C. Swab tests from various parts of the apparatus, and from bottles, showed that some parts of the plant contained organisms which, though present in very small numbers, were capable of extremely rapid multiplication. Some 24 cultures were isolated and growth in milk was tested after inoculation with 10 organisms per cc., and incubation for 24 hours at 18°C. Of these cultures, 13 gave counts ranging from 10 to 52 million per ml.; 6 gave counts from 1–7 million and 5 counts of 380,000 or less. Two cultures were found to be *Bact. aerogenes* and both multiplied very rapidly in pasteurized milk.

All the samples of pasteurized milk which showed these very high counts after incubation passed the resazurin and official half-hour methylene blue tests.

These rapidly proliferating organisms were not derived from the raw milk (as they were killed by pasteurization) but from the plant. The plant and bottles were sterilized by the use of a hypochlorite solution, and the organisms seem to have become chlorine-resistant. At the end of 1946 these organisms ceased to contaminate plant, bottles or milk samples; this was, however, considered to be dependent on seasonal variation in in conditions.

THOMAS, S. B., EVANS, E. J., & JONES, L. B. (1947.) **The incidence of thermoduric organisms in farm milk supplies with some observations on the dominant types.**—*Proc. Soc. Applied Bact.* No. 1. pp. 15–18. [Abst. in *Bull. Hyg., Lond.* **23.** 540–541. (1948), copied *verbatim*. Signed: W. G. SAVAGE.] **2563**

The samples were kept at 63·5° ± 0·1°C. for 30 minutes, cooled and plated on yeastrel milk agar, and incubated for four days at 30°C. The thermoduric colony counts were highest during December to February, and June to August in one series, but in another series (1,444 samples) this seasonal variation was less marked as the percentage of samples with over 1,000 thermoduric organisms was 67 (winter) 62 (summer) 59 (autumn) and 53 (spring quarters). Fairly wide daily variations were observed. The type and efficiency of methods of sterilization of utensils had a marked influence upon the numbers of thermoduric organisms. A table shows that the lowest counts were found when the utensils were treated with boiling water or hypochlorite, and that by far the worst results occurred when warm water only was used. The efficiency of steam sterilization was between the two, but these samples were mostly from farms with more cows and using milking machines and surface coolers. These appliances probably accounted for many of the high thermoduric counts. In all, 794 colonies of thermoduric organisms were isolated. Microbacteria formed about 70 per cent., with micrococci and sarcinae 11 per cent. or more. The type of sterilization for utensils used did not materially affect the proportion of the different types.

SATTA, E. (1948.) Significato e finalità del trattamento igienico del con acqua ossigenata elettrolitica a 130 volumi. **[The treatment of milk with hydrogen peroxide.]**—*Riv. ital. Igiene.* **8.** 183–223. [English summary.] [Abst. in *Bull. Hyg., Lond.* **23.** 882. (1948), slightly modified. Signed: J. C. BROOM.] **2564**

This paper opens with a summary of the results, previously obtained by the author and his colleagues, of the preservative action of hydrogen peroxide on milk. The effects of the addition of 130-volume strength to a total concentration of 0·2 per cent. are described as follows:– (1) A metallic taste is produced, but disappears spontaneously in 8–10 hours. (2) The fats tend to separate out, but go back into suspension on shaking. (3) The bacterial content is reduced by 94–99 per cent. after 14–18 hours, but increases again after 20–24 hours. At 48 hours the apparent reduction is from 38 to 85 per cent., depending on the temperature of storage. (4) When 30,000 *Bact. coli* were added per ml. of milk, tests showed none present in 10 ml. 8–10 hours after treatment. (5) When 15 million *Salm. typhi* per ml. were added, none was present in 5 ml. 8–9 hours after treatment. (6) When 30 million *Brucella melitensis* per ml. were added, none were present in 5 ml. 30–60 minutes after treatment. (7) When 1·0 mgm. (wet weight) of *Myco. tuberculosis*, bovine type, per litre was added, none were present in 0·5–1·0 ml. 25 hours after treatment.

A résumé is then given of the observations of other workers who confirmed or disagreed with the above findings. The author then dissects their results and proves to his own satisfaction that their objections are not valid. As a result of this review, the general conclusion is reached that the addition of hydrogen peroxide is valuable especially during the summer, and when there is considerable delay between collection and pasteurization.

GINSBERG, A., & ROBERTSON, A. (1949.) **Meat hygiene.**—*Vet. Rec.* **61.** 9–10. **2565**

The inspection of home produced meat in Britain has not been well organized, but this country has insisted on a very high standard of inspection for imported meat. The standard for home processed meat products has been unsatisfactory. The authors doubt if meat can be imported, at least for a long time, on the pre-war scale. They state that, with the influx of foreigners during the war years, many carriers of cysticercus bovis, salmonella infections, etc., have taken their places within the population and thus increased health hazards. As a consequence improved veterinary supervision of animal foodstuffs is required. Improvement in the teaching of meat hygiene in British veterinary colleges is needed, so that graduates may acquire suitable training in this subject. Comparisons are made with the conditions in these respects in certain other countries.—R. MACGREGOR.

ORR, D. E. (1949.) **Meat and food inspection service.**—*Vet. Rec.* **61.** 161–162. **2566**

A rational meat supervision service cannot be planned in Great Britain until it is known on what lines the industry will develop in the future. At present it is not known whether the industry will be centrally controlled, or be handed back to private enterprise, but the author thinks the situation will probably end in a compromise, with private enterprise but with centralized slaughter. While stressing the importance of veterinary control over the hygiene of the live animals, their slaughter, and the final distribution of the meat, the author considers that the veterinarian is not the best man to supervise many other aspects of the industry and that he should not seek to do so. —R. MACGREGOR.

LOTTI, L. (1947.) Sulla utilizzazione alimentare delle carni suine infette da *E. Rhusiopathiae*. **[Pork infected with *E. rhusiopathiae*, as food.]** —*Zooprofilassi.* **2.** No. 9. pp. 10–18. **2567**

Infected pig carcasses, slaughtered in emergency during outbreaks of swine erysipelas, may be utilized with safety in the preparation of sausages, provided the seasoned, minced meat is boiled for one hour at 100°C.—I. W. JENNINGS.

GOULD, S. E., & KAASA, L. J. (1949.) **Low temperature treatment of pork. Effect of certain low temperatures on viability of trichina larvae.** —*Amer. J. Hyg.* **49.** 17–24. [Authors' conclusions slightly amended.] **2568**

The following temperatures maintained for the designated periods, in the central portions of pork, are believed to be effective in killing all trichina larvae which may be present: –27°C maintained for 36 hours; –30°C maintained for 24 hours; –33°C maintained for 10 hours; –35°C maintained for 40 minutes; –37°C maintained for two minutes. Some or all of these temperatures may be found to be practical for commercial use in processing pork so as to free it from the danger of trichinosis. It seems that considerable economy might be effected by subjecting pork products to rapid methods of refrigeration or to lower temperatures for much shorter periods than are now required in federally inspected plants. There is need for a comprehensive reinvestigation of the subject of quick freezing of pork as a practical commercial method of destroying trichinae.

GILLESPIE, J. M. (1946.) **Tests for quality in egg pulp. III. The influence of bacteria in pure and mixed culture on the resazurin reductase test.**—*J. Coun. sci. industr. Res. Aust.* **19.** 117–127. [Author's summary copied *verbatim*.] **2569**

A survey has been made of the types of bacteria most frequently occurring in samples of Australian commercial egg pulp. Data are given concerning the relationship between reduction time and bacterial plate count for a selection of these organisms inoculated into "sterile" egg pulp. The regression equations calculated for these data show that there are highly significant differences between the rates of reduction of resazurin to resorufin in egg pulp by a number of genera of bacteria.

Experiments are described which investigate some of the factors influencing the reductase test for quality in egg pulp.

BOYER, J. (1948.) Du danger d' l'emploi des gaz toxiques dans la désinsectisation et la dératisation des locaux d'habitation. **[Danger arising from the use of poisonous gases when destroying insects and rats in living rooms.]**—*Ann. d'Hyg. Pub., Indust. et Sociale.* **26.** 26–31. [Abst. in *Bull. Hyg., Lond.* **23.** 422–423. (1948), copied *verbatim*. Signed: E. L. COLLIS.] **2570**

Certain toxic gases, such as hydrocyanic acid, chloropicrine, methyl bromide and ethylene oxide, if correctly used, give excellent results for the destruction of insects and rats. But a number of fatalities are reported from improper use of hydrocyanic acid and bromide methyl. Such a case is now reported. The expert of a society for insecticides was requested to destroy flour-mites at a mill. While at work he was asked to treat an old house infested with bugs. This second job he undertook without giving the required statutory notice to the authorities. He used hydrocyanic acid gas. Three days later the inhabitants, a man with his wife and 18-month-old child, resumed occupation. Unfortunately, all windows and doors were carefully closed for the night. During the night the woman became violently ill and the child

died. The man got into the fresh air, suffering from severe headache and vertigo. The evidence incriminating the hydrocyanic acid gas for the occurrence is clearly stated. Then the author, who had been appointed to inquire into the matter, tenders the advice to the authorities to forbid the use of hydrocyanic acid, methyl bromide or ethylene oxide in the destruction of insects or rats in human habitations. Equally good results can be obtained by using chloropicrin, a far less dangerous gas.

REPRODUCTION AND REPRODUCTIVE DISORDERS

Södergren, L. O. (1948.) A. i.-tjurarnas utfodring och skötsel. **[Artificial insemination. Feeding and care of bulls.]**—*Svensk VetTidskr.* **53.** 167–175. [Abst. from English summary.] **2571**

To maintain in good health bulls used for artificial insemination and to obtain a high percentage of pregnancy, the importance of well balanced feeding is pointed out. The relationship between protein and carbohydrates in the feed should be optimal and the requirements of vitamins and minerals satisfied. The feeding should be modified, as much as possible, according to each bull's individual need. Sudden changes of the feed should be avoided. Daily exercise in loose deep ground is advocated as very necessary for gaining a desirable obedience and a good contact between the bulls and their caretakers.

Blom, E. (1947.) Om Medusadannelser (afstødte Fimrebraemmer) i Tyre- og Hingstesperma og disses diagnostiske Betydning. **[Medusa-like bodies (detached ciliated borders) in bull and stallion semen and their diagnostic significance.]**—*Skand. VetTidskr.* **37.** 257–265. [Abst. from English summary.] **2572**

B. observed in semen samples from healthy bulls and stallions medusa-like bodies of the approximate size of the head of a spermatozoon.

These bodies are detached fragments of the ciliated border of epithelial cells, lining the efferent tubules of the testicle. In healthy bulls they number about one per 10,000 spermatozoa. In bulls affected with pathological changes of the testicle and epididymis, about 20 per 100 spermatozoa were demonstrated in the sediment of centrifugated samples of a very low concentration.

The importance of these findings for evaluating samples of minimum concentration is pointed out.—E. G.

Salisbury, G. W., Knodt, C. B., & Bratton, R. W. (1948.) **The freezing point depression of bull semen and its relation to the diluter problem.**—*J. Anim. Sci.* **7.** 283–290. **2573**

The variation in osmotic pressure of bull semen was examined using the normal cryoscopic method for the depression of the freezing point. The volume of semen used was from 4–5 ml. The apparatus was standardized against milk and solutions of sucrose of known freezing point depression.

Forty-five samples were analysed and a frequency histogram was plotted against the value of freezing point depression. A positive correlation coefficient between spermatozoa count and freezing point depression, indicated that as spermatozoa decreased, the magnitude of freezing point depression increased. The effect on viability of spermatozoa, of a diluent consisting of a freshly made solution of 3·6 g. of sodium citrate per 100 ml. of distilled water, mixed with an equal volume of egg yolk was studied; this diluent markedly favoured the survival of spermatozoa in storage. Second ejaculates lowered the freezing point less than the first, and in fact approached the freezing point depression value for bull blood. The depression of the freezing point value increased with storage, probably owing to accumulation of katabolic molecules. Experimental results of depression of the freezing point were –0·617°C., –0·641°C. and –0·663°C. for five samples, when analysed initially, and after five and 11 hours respectively.

Again 31 samples of semen were collected and immediately placed in ice-cold water. Freezing points were taken as quickly as possible. The class of greatest frequency was –0·55°C. (range –0·54 to –0.559°C.). The authors conclude that fresh bull semen has a depression of freezing point value approaching that of cattle blood and recommend a modified buffer of 2·9 g. of sodium citrate per 100 ml. of distilled water with an equal volume of yolk, as a diluent; this being isotonic with blood.—Arthur W. Marrable.

Hennaux, L., Dimitropoulos, E., & Cordiez, E. (1948.) L'action de la pénicilline, à doses thérapeutiques, sur la sécrétion spermatique du taureau. **[The action of penicillin in therapeutic doses on semen production by bulls.]**—*C.R. Soc. Biol., Paris.* **142.** 410. **2574**

An 18-month-old bull weighing 410 kg. was injected subcutaneously with 800,000 units of penicillin daily for three days.

A semen sample collected before treatment proved first class by the usual microscopic tests and sexual vigour was marked.

Samples collected three hours and 15 hours after the last injection had lowered volume, motility and spermatozoa concentration, methylene blue was not reduced and morphologically

abnormal spermatozoa were numerous. Sexual vigour was depressed.

Nine days after treatment the semen sample slowly regained its original characteristics.

After an interval of 17 days the same dose of penicillin was administered with similar results. Penicillin was not detected in the semen 45 min. and three hours after the last injection.

—E. J. H. Ford.

Almquist, J. O., Glantz, P. J., & Shaffer, H. E. (1949.) **The effect of a combination of penicillin and streptomycin upon the livability and bacterial content of bovine semen.**—*J. Dairy Sci.* **32.** 183–190. **2575**

From each of 13 ejaculates nine samples were taken and diluted with 24 parts of egg-yolk citrate to which had been added penicillin and streptomycin in various concentrations from 0–1,000 units of each per ml. Samples were stored at 4·5°C. and motility determined at two-day intervals for 20 days. Results given in a table indicate no significant effect of treatments on motility. Plate counts were made on the samples and on both diluted and undiluted control semen before storage and after eight days. Tables of results indicate no growth from treated semen and low counts from controls.

In view of these low counts five ejaculates were inoculated with bacteria previously isolated from semen and after eight days storage negative plate counts were obtained at levels greater than 100 units each of penicillin and streptomycin.

When coliform bacteria were used as the inoculum counts were negative at all levels of antibiotics. In all cases plate counts of controls both diluted and undiluted were reduced following eight days' storage.—E. J. H. Ford.

Loeb, E. N., Knowlton, A. I., Stoerk, H. C., & Seegal, B. C. (1949.) **Observations on the pregnant rat injected with nephrotoxic rabbit anti-rat placenta serum and desoxycorticosterone acetate.**—*J. exp. Med.* **89.** 287–293. [Authors' summary copied *verbatim*.] **2576**

Pregnancy enhances the susceptibility of the rat to intercurrent renal damage produced by anti-placenta serum. This is manifested by the development of renal hypertrophy and nephritis in a number of these animals. Both renal hypertrophy and nephritis are consistently intensified by the concomitant administration of DCA.

Hypertension develops in both pregnant and non-pregnant rats treated with the anti-placenta serum employed together with the daily administration of DCA.

Termination of pregnancy, in the face of continued DCA administration, fails to lower the blood pressure or to arrest the nephritic process.

Whitten, W. K. (1948.) **Inactivation of gonadotrophins. II. Inactivation of pituitary chorionic gonadotrophins by influenza virus and receptor-destroying enzyme.**—*Aust. J. Sci. Res.* Ser. B. **1.** 388–390. **2577**

W. found that LEE-B influenza virus and *Vibrio cholerae* receptor-destroying enzyme inactivated chorionic gonadotropin and the follicle-stimulating component of an anterior pituitary gonadotropin preparation.—W. P. Rogers.

Asdell, S. A. (1949.) **Hormones and the treatment of sterility in dairy cattle : a review.**—*J. Dairy Sci.* **32.** 45–59. **2578**

In this review of the literature on hormonal treatment of sterility in cattle, A. lists the products available both natural and synthetic and then discusses the reports of their use in the various conditions encountered.

He stresses the haphazard nature of most of the work reported, in which empirical amounts of hormones were injected into animals, the existing hormone levels of which were not known.

Results which might well have been due to factors other than hormones were attributed to treatments because of lack of adequate controls.

[A. states that in " suboestrum " there are no corpora lutea in the ovary, whereas Murray introduced the term to describe a condition in which the ovarian cycle is normal but oestrus is not exhibited.]—E. J. H. Ford.

Fey, W., & Thomann, H. E. (1948.) Über die Deckergebnisse bei Zuchtstuten sowie über Versuche zu deren Verbesserung durch Vitamin E-Behandlung. **[Fertility of brood mares : experiments with vitamin E.]**—*Schweiz. Arch. Tierheilk.* **90.** 113–133. **2579**

The authors describe their investigations into the effect of vitamin E treatment on fertility in two Swiss stud farms.

Over three breeding seasons, the total number of untreated mares was 1,021, the treated group numbered 212, while all three stallions used on one farm received treatment and the two untreated stallions on the other farm were only used to serve a number of untreated mares. The use of official records, in conjunction with the systematic follow-up of mares by detailed questionnaires to owners and the early diagnosis of pregnancy by means of the highly reliable " Roche " urine test, allowed the breeding results to be fully recorded in all treated mares and in all but 0·88% of the untreated mares.

Seasonal treatment of the stallions with 0·05 g. *dl-α*-tocopherol every second day had the effect of noticeably augmenting their libido. The treatment of the mares was carried out by their owners, under instructions, and with free supplies of vitamin E tablets before service.

This caused a rise of about 5% in the total number of conceptions, and a rise of about 7% in the total number of foals capable of being fully reared. In a smaller group of the mares, in which there had been a 15·4% loss of foals through abortion, stillbirth and neonatal mortality, the treatment reduced these secondary losses by 40% (to 9·4%).

The history of a group of 110 mares was analysed as to their constitutional disposition towards conception. No data could be obtained for 15 of these. Of the remaining 95, 59 (about 62%) gave cause to assume it as favourable, and in the other 38% it was shown to be jeopardized by such factors as age and pathological conditions of the genital organs. It is worth noting that, in this last group treatment with vitamin E made conception possible in every second animal (about 53%).—G. P. Marshall.

Bartlett, D. E. (1949.) **Infectious disease as a cause of infertility : a review.**—*J. Dairy Sci.* **32.** 36–44. **2580**

This article is a review of present knowledge of diseases, both specific and non-specific, affecting the genital organs of cattle.

The clinical aspects of coital exanthema, trichomoniasis, brucellosis and *Vibrio foetus* infection are described and practical control measures indicated. The doubtful significance of granular vaginitis is discussed and the occurrence of *Corynebact. pyogenes*, pleuropneumonia-like organisms and moulds in the genital tract is mentioned.

The need is stressed for keeping accurate breeding records and for investigations into the causes, effects and control of many conditions of the reproductive tract of which our knowledge is at present scanty.—E. J. H. Ford.

Hoelzer, H. (1948.) Einflüsse von Jahreszeit und Fütterung auf die Fruchtbarkeit des Rindes. **[Seasonal and nutritional influences on fertility of cattle.]**—*Dtsch. tierärztl. Wschr.* **55.** 136–138. **2581**

H. provides statistics covering his experiences with 649 cattle in an insemination station in the spring of 1946, and relating to fertility, milk yield, cases of infertility and condition of semen.

Having pointed to the difference between these data and those previously published for horses, he dwells at length on the need for sensible feeding in preference to indiscriminate medication.—G. P. Marshall.

Hayward, A., Vinattieri, E., & Chawla, L. R. (1949.) **Retention of placenta in the buffalo.**—*J. R. Army vet. Cps.* **20.** 29–34. **2582**

Retention of the placenta is a serious cause of loss of milk in military buffalo dairies in India. Experimental treatments which were tested are described. In the past the standard treatment had been flushing the uterus and vagina with large quantities of potassium permanganate solution. Results had been unsatisfactory as the treatment delayed involution of the uterus and was followed by infertility in many cases. In the trials three medicaments were tested (a) pessaries consisting of animal charcoal 1 oz., iodoform one-half oz., with cocoa butter as a vehicle ; (b) an emulsion of bismuth subnitrate 1 oz., iodoform one-half oz., arachis oil 500 ml. ; and (c) acriflavine 1% aqueous solution, 10 ml., and glycerin 90 ml.

A course of treatment with these medicaments is described. The results on 63 cases are tabulated and indicate that the acriflavine-glycerin solution was the most effective. Sequelae such as eversion of the uterus, which is more common in the buffalo than in the cow ; cervicitis ; mastitis, and infertility are also briefly discussed.—M. C.

See also absts. **2497** (microphthalmia) ; **2498** (malformation of genito-urinary tract).

ZOOTECHNY

Seath, D. M., & Miller, G. D. (1948.) **A self-serving sprinkling device for cooling dairy cattle.**—*J. Anim. Sci.* **7.** 251–256. **2583**

Spraying with water is an effective means of lowering the body temperature and respiration rate of cows exposed to high environmental temperatures. Cows could not be induced to make voluntary use of a coarse spray, but when a type of nozzle producing a fine mist-like spray was provided in a bamboo shelter they readily made use of it. It was found that heifers made less use of the spray than did milch cows.—M. C.

Wallach, D. P., Newland, H. W., & McMillen, W. N. (1948.) **Some studies on temperature adaptation in the baby pig.**—*Quart. Bull. Mich. agric. Exp. Sta.* **30.** 277–282. **2584**

Losses of baby pigs attributed to chilling had been very heavy in the Mid-western states of the U.S.A. in the spring of 1947. The authors studied some aspects of heat regulation in the baby pig. The temperature of the new-born pig dropped by 3°–9°F. during the first hour after birth, after which there was a gradual increase to normal which was reached at the 48th hour. The ability of baby pigs to maintain their body temperature at low room temperatures was not properly developed until they were two days old. Young pigs did not appear to have a cooling mechanism capable of

protecting them against excessive heat; when placed in chicken brooders at 118°F. for half an hour their body temperature rose 6°–8°F.—M. C.

GUSTAFSSON, B. (1948.) **Germ-free rearing of rats. General technique.**—*Acta. path. microbiol. scand.* Suppl. No. 73. pp. 130. [In English.] **2585**

In order to study whether life without bacteria is possible G. perfected a technique of rearing germ-free rats. Several difficulties have to be overcome to achieve this object. There has been evolved a special rearing apparatus which can be sterilized and remain sterile over a long period. The air, and any object entering the apparatus must, of course, be sterile and must pass through a bacterial trap. In order to obtain germ-free rats Caesarean section is performed. This operation under sterile conditions, together with the difficulty of transferring the young to the rearing apparatus is a special technique. A further problem to be solved is the feeding of the young rats. When experimenting with non-sterilized rats' milk a feeding schedule was evolved in which 0·1–0·5 ml. was administered by catheter 5–6 times daily until about the 27th day when the milk diet was gradually replaced by solids. Automatic feeders were not practicable. G. did not succeed in rearing on sterilized milk new-born rats removed from the mother at birth; an artificial milk mixture capable of being sterilized whilst retaining its high nutritive value had to be composed. Some observations on germ-free rearing experiments are discussed.—L. G. DONALD.

See also absts. **2571-2575** (artificial insemination).

TECHNIQUE AND APPARATUS

PROOM, H., & HEMMONS, L. M. (1949.) **The drying and preservation of bacterial cultures.**—*J. gen. Microbiol.* **3.** 7–18. [Authors' summary slightly amended.] **2586**

Working details are given for keeping as desiccates a collection of some 1500 strains of bacteria. The efficacy of drying, the various methods of freezing, and the effect of storage were tested by viable counts, using a spinning bottle modification of the roll-tube method. The survival rate of bacteria suspended in broth or other protective colloids, and subjected to freezing at −78°C., varied with the species from about 100% with the resistant *Staphylococcus aureus* to about 10% with the sensitive *Neisseria gonorrhoeae*, and from about 100 to 1·5% or less, respectively, when the organisms were suspended in saline. The percentage of organisms which survive the freeze-drying process was found to vary with the species, from 100% to less than 1·0% when the organisms were suspended in broth and from 100% to no survivors when the organisms were suspended in saline. The storage loss of dried cultures was found to be a function of the storage temperature; however, suitably dried cultures could be kept at room temperature for very long periods. By far the most important factor influencing loss on storage was the presence of traces of moisture, and to ensure optimal survival the cultures must be as dry as possible. It appears that even with adequately dried cultures the presence of oxygen is deleterious.

The survival rate of bacteria in a sample of dried culture after heating to 80°C. for 1 hour, determined by plating a suspension of the heated sample in broth, provides a simple measure of the capacity of the particular batch of the dried culture to remain viable on storage at ordinary temperatures.

WOIWOD, A. J. (1949.) **A technique for examining large numbers of bacterial culture filtrates by partition chromatography.**—*J. gen. Microbiol.* **3.** 312–318. [Author's summary copied *verbatim*.] **2587**

A description is given of apparatus and methods which have been used to produce large numbers of satisfactory and reproducible chromatograms of bacterial culture filtrates. Some of the factors which influence the preparation and development of chromatograms are discussed.

SPENDLOVE, G. A., CUMMINGS, M., & PATNODE, R. A. (1949.) **Demonstration of tubercle bacilli in sputum smears.**—*Publ. Hlth Rep., Wash.* **64.** 574–580. [Authors' summary and conclusions copied *verbatim*.] **2588**

Four series of sputa, consisting of 500, 263, 244, and 716 specimens, have been studied.

Smears made of selected particles gave more positive results in each series than smears made following concentration of the same specimens by the various methods of sodium hydroxide digestion used.

Sodium hydroxide digestion and concentration techniques are quite exacting in their requirements.

Macroscopic selection is dependable and probably superior to sodium hydroxide digestion and concentration by the methods described.

QUANDT, J. (1944.) Erfahrungen mit der Karbolnachtblaufarbung der Tuberkelbazillen im Sputum und Gewebe. **[Carbol night blue staining of tubercle bacilli in sputum and tissues.]**—*Zbl. Bakt. I.* (*Orig.*). 151. 348–350. [Abst. in *Stain*

Tech. **22.** 80. (1947), copied *verbatim*. Signed: C. RANDALL.] **2589**

A method for staining tubercle bacilli in sputum and tissue slices is described. The staining solution is prepared by adding immediately before use 10 ml. of 5% night blue in 95% alcohol to 90 ml. of the following solution: 2·5 ml. melted phenol; 0·2 ml. 10% KOH; 100 ml. distilled water. The destaining solution consists of 3 ml. 25% HCl in 100 ml. 70% alcohol. Chrysoidin, 2 g. in 300 ml. distilled water, is used as the counterstain. The technic is that of the Ziehl-Neelsen procedure.

When this method is used, the bacilli can be easily distinguished from the stroma and tissue background.

MCKENZIE, D. A., & LAMBERT, J. (1947.) **A modified procedure for determining the thermoduric bacterial content of milk.**—*Proc. Soc. Applied Bact.* No. 1. pp. 19–20. [Abst. in *Bull. Hyg., Lond.* **23.** 541. (1948), copied *verbatim*. Signed: W. G. SAVAGE.] **2590**

Briefly, the method used was to pasteurize the milk in this laboratory at 147°F. for 30 minutes, and add 0·01 ml., as delivered by a calibrated platinum loop, to 9 ml. melted yeastrel milk agar (2 per cent. agar) at 45°C. contained in a 2 oz. medical flat bottle. After mixing, the solidified agar was incubated at 30°C. for three days, and the colonies were counted. A comparison is given of 242 samples counted both by this bottle method and by ordinary plate counts. Rough agreement was obtained, but in 61·5 per cent. of samples the bottle count was lower than the corresponding plate count, probably because bacterial clumps were not so well broken up in the bottle method.

If a standard of 20,000 thermoduric organisms per ml. by plating is considered evidence of unsatisfactory production conditions, the corresponding bottle count standard would be 10,000. By these two standards, only 3·3 per cent. of samples failed the bottle test and passed the plate count, and 4·5 per cent. passed the bottle test and failed the plate count test. The bottle method saves labour and glassware, but is unsuitable for the isolation of colonies, and it is more difficult to count accurately by this method. Precautions necessary to obtain reliable results are set out.

LARIONOV, L. P., & BRUMBERG, E. M. (1948.) **Living and dead cells under the ultraviolet microscope.**—*Amer. Rev. soviet med.* **5.** 111–114. [Abst. in *Stain Tech.* **23.** 221. (1948), copied *verbatim*. Signed: H. J. CONN.] **2591**

The writers employ the ultraviolet microscope of Brumberg and Hershgorin, modified by use of an achromatic objective (aperture 0·5). Such a microscope has been used by previous workers mainly on fixed tissue; but the writers follow Brumberg's work on living cells at a wave length of 260 mμ, which reveals a nuclear structure identical with that observed in fixed preparations. The equipment employed by the present authors is such that focusing can be done in visible light, thus avoiding exposure of the living cells to the ultraviolet rays until the first photograph is made. Living cells were photographed in tissue cultures prepared with the hanging drop method on a quartz coverslip; the coverslip with the culture was placed upon a quartz slide in a drop of Ringer's solution. The writers find that nuclear elements (except nucleoli) of intact living cells show no absorption of ultraviolet rays of wave lengths from 254 to 275 mμ; but when the cell is damaged, ultraviolet rays begin to be absorbed. The cytoplasm of a killed or damaged cell loses its ability to absorb ultraviolet rays. The writers conclude that this technic offers new possibilities for the study of living cells. Photomicrographs are included in the paper to illustrate the points discussed.

OETTLE, A. G. (1944.) **A technique for changing from a bright to a dark ground condenser while a slide bearing a watery mount is still under an oil immersion objective.**—*J. R. micr. Soc.* **64.** 124–128. [Abst. in *Stain Tech.* **23.** 45. (1948), copied *verbatim*. Signed: PAUL G. ROOFE.] **2592**

The apparatus consists of a brilliant source of light with an iris diaphragm, a wide aperture reflecting dark-ground condenser such as the cardioid, and an oil immersion objective with an iris diaphragm. The condenser should produce a hollow cone of light where the most oblique rays have a numerical aperture greater than 1·33 and the least oblique rays have a numerical aperture less than the maximum for the objective. Theoretical requirements for this system are fulfilled by the Zeiss-Sidentopf cardioid condenser N. A. 1·21–1·37 and a Zeiss achromatic oil immersion objective rated as 2 mm. (90X), N. A. 1·25, with an iris diaphragm by which the N. A. may be reduced to 0·55.

Good quality slides are essential. Four steps in the technic are given. With this rapid technic changing from bright to dark ground, illumination is accomplished without disturbing the slide under oil immersion.

BARRON, A. L. E. (1947.) **Metal-coated mirrors.**—*Microscope, Lond.* **6.** pp. 225–226. [Abst. in *Stain Tech.* **23.** 155. (1948), copied *verbatim*. Signed: C. RANDALL.] **2593**

Three mirror coatings are discussed. Rhodium, which is electroplated on to a vacuum-deposited chemically inert film on a glass base, has

a reflectivity over 70% and is very durable. "Chroluminum" consists of a triple deposit of chromium undercoating, aluminium reflecting layer, and protective silica finish and must be treated with reasonable care. "Duolux", a semi-transparent light-splitting film, can be cleaned with HNO_3 and detergents and is little affected by hard rubbing.

HAMILTON, J. D., & BARR, M. L. (1948.) **An elliptometer. A simple method of measuring the areas of structures in microscopic sections.** —*Stain Tech.* **23.** 123–127. [Authors' abst. copied *verbatim*.] **2594**

A simple method of measuring the cross sectional areas of objects (such as cells) in microscopic sections is described. A beam of light is passed through an adjustable diaphragm and focused by a lens on a screen of mm. ruled graph paper. The screen may be rotated about a horizontal axis. Adjustment of the aperture of the diaphragm and the plane of the screen yields illuminated areas of variable size and degree of ellipticity. As close a "fit" as possible is made between the illuminated area and the camera lucida tracing of the object to be measured. The lengths of the major and minor axes of the appropriate ellipse are read from the screen. The application of the formula for the area of an ellipse to mean major and minor axes for a group of cells gives the mean cross sectional area for the cell population under investigation.

KINGMA BOLTJES, T. Y. (1947.) **Some remarks on microphotography.**—*Antonie Van Leeuwenhoek.* **12.** 232–242. [Abst. in *Stain Tech.* **23.** 91. (1948), copied *verbatim*. Signed: H. J. CONN.] **2595**

Consideration is given to various refinements in technic in connection with critical photomicroscopy. Special attention is given to the use of ultraviolet light of 365 mμ obtained from a mercury vapor lamp (e.g. Philips HP–800), with the proper filter. Although this light is not far from the visible violet, it makes no impression on the eye and accordingly cannot be used for focusing. The writer therefore focuses with the use of a filter giving light of 436 mμ, and then determines by means of six or eight test photographs how much the microscope tube must be raised to obtain sharp focus with light of 365 mμ; this factor once learned, it can then be applied to later focusing with the same instrument, provided care is taken to make all fine adjustments in the same direction of the screw, to avoid backlash. The writer concludes that the greater resolving power of the ultraviolet light is worth taking advantage of, but that other refinements such as use of apochromatic objectives are of less value; this latter observation derives from the fact that apochromats have no theoretical advantage over achromats when monochromatic light is used.

FROOME, K. D., & JARRET, B. A. (1944.) **The instantaneous photomicrography of living micro-organisms.**—*J. R. micr. Soc.* **64.** 136–146. [Abst. in *Stain Tech.* **23.** 45. (1948), copied *verbatim*. Signed: PAUL G. ROOFE.] **2596**

The camera, with its shutter and body, mechanical timer, electric timer and electric shutter completely described in this article, overcomes the difficulties occurring in the conventional micro-cameras. The following new features are installed in the camera to overcome these drawbacks: (1) Ciné-film is used decreasing the exposure time, thus eliminating blurring by a rapidly moving object. (2) The principal feature of their camera lies in the shutter, which is electrically operated, the timer, both mechanical and electrical, being separate from the camera, thus eliminating vibration by the old methods. (3) The timer is released by foot, thus allowing free use of both hands. (Shutters of normal design were hand operated.) (4) Maximal light reaches the film because the shutter itself is a partial mirror. By inclining the shutter a convenient percentage of light is reflected into an auxiliary viewing eye piece up to the instant of exposure. Exposure time is thus cut down.

Applications of the camera are given. The chief value lies in the comparative ease with which it is possible to take photographs of moving microscopic life.

NICHOLAS, J. W. (1947.) **The recording of exposure data in photo-micrography.**—*Microscope, Lond.* **6.** pp. 263–265. [Abst. in *Stain Tech.* **23.** 157. (1948), copied *verbatim*. Signed: C. RANDALL.] **2597**

A system of recording exposure data in photomicrography which is adaptable to any method of illumination or microscopic observation is described. Type of apparatus, focal length of lenses, aperture, and focusing arrangements are recorded in sufficient detail that a new worker may exactly duplicate the conditions of any exposure with only the written record as a guide.

RAEBURN, L. T. (1944.) **Side focusing eyepiece for small micro-cameras.**—*J. R. micr. Soc.* **64.** 147–148. [Abst. in *Stain Tech.* **23.** 45. (1948), copied *verbatim*. Signed: PAUL G. ROOFE.] **2598**

A concise description is given, illustrated by two figures, of a camera with a built-in side focusing eyepiece. By the method described, the following difficulties are overcome: (1) rigidity of the apparatus with its vibration; (2) the necessity of focusing on ground glass or plane glass by means of a hand magnifier.

The box attachment to the camera is of such

a nature that by merely swinging a mirror (housed in the box) to a vertical position, one is able to proceed with the taking of the photograph.

SEMMENS, C. S. (1947.) **Theory and technique of cyto-microchemistry.**—*Microscope, Lond.* **6.** 197–200. [Abst. in *Stain Tech.* **23.** 96. (1948), copied *verbatim.* Signed: H. J. CONN.] **2599**

This brief article is really but an introduction to the subject indicated by the title. The only phase of the subject treated is that of fixation of tissue and its probable effect on cell chemistry, especially on the chemistry of chromatin. It is pointed out that when a piece of living material is put into a fixing solution the constituents at once lose the normal properties of living matter. It is reasonable to suppose that an ordinary fixing agent may cause molecular modifications similar to those that result from the action of "denaturing" agents on protein extracts in large scale biochemical investigations. The author indicates that the protein of fixed tissue may well be "denatured" protein; but insists that the validity of this assumption still remains to be tested experimentally.

BOURDON, P. (1942.) L'utilisation des résines artificielles (polystyroléne), comme milieu de montage, avec ou sans lamelles. [**Use of synthetic resins (polystyrolene) as mounting media, with or without cover slips.**]—*Bull. Histol. Tech. micr.* **19.** 175–176. [Abst. in *Stain Tech.* **21.** 115–116. (1946), copied *verbatim.* Signed: JEAN E. CONN.] **2600**

A previous article [*Bull. Histol. Tech. micr.* **19.** 238. (1941.)] described the use of a cellulose varnish for mounting preparations which served both as a mounting medium and as a cover slip; but a commercial product was then used which was of indefinite composition and difficult to obtain. A commercial solution of polysterolene which had a very high molecular weight gave excellent results as a varnish, but was unsatisfactory for use with a cover slip because it lost 4/5 [four-fifths] of its mass on drying. However, by partial polymerization of styrolene, a product was obtained which was satisfactory for both purposes. It is prepared as follows: boil gently 100 ml. styrolene until the liquid becomes of a consistency similar to glycerine; extinguish the flame and add 5 ml. of tricresyl phosphate; stopper the flask and chill rapidly. The liquid obtained is colorless, has a refractive index of approximately 1·53 and a viscosity comparable to that of Canada balsam. When used without a cover slip, this medium gives excellent preservation of color.

PORTER, R. W., & DAVENPORT, H. A. (1949.) **Golgi's dichromate-silver method. I. Effects of embedding. II. Experiments with modifications.**—*Stain Tech.* **24.** 117–126. [Authors' abst. copied *verbatim.*] **2601**

Paraffin embedding was found to be satisfactory for brain stained by a modification of the Golgi dichromate-silver method. Nitrocellulose embedding caused fading in a few specimens. Several modifications in which the tissue was impregnated with silver nitrate before treating it with potassium dichromate were investigated. The following one is recommended. Fix pieces of brain 5–6 mm. thick for 2 days in: silver nitrate, 0·5%, 90 ml.; formalin, comml. unneutralized (37–40% gas), 10 ml.; pyridine, pure, 0·05–0·1 ml. Mix in the order given and test for pH with brom cresol purple. A pH of 5·5–6·0 is about optimum and the amount of pyridine added can be varied to adjust it. A slight turbidity of the fixing fluid can be disregarded, but precipitation indicates too much alkalinity. Rinse the tissues with distilled water and place them in a mixture of potassium dichromate, 2·5%, 100 ml. and osmic acid, 1%, 1 ml., for 3–5 days. Wash in water, dehydrate with alcohol and embed in soft paraffin for thick sectioning. Greater intensity of staining (but with an increase in precipitate) can be secured by rinsing the blocks after the dichromate treatment and resilvering in a 0·5% solution of silver nitrate for a day or two, then washing, dehydrating and embedding. This modification of the Golgi method was worked out on brain of adult rat, guinea pig, cat and monkey. Results with fetal material were not good. All solutions used were aqueous, and staining was done at room temperature.

TRUE, R. M. (1948.) **Elimination of fat and protein prior to the selective staining of bone.**—*Stain Tech.* **23.** 119–122. [Author's abst. copied *verbatim.*] **2602**

The technic of staining skeletal systems previously described is often unsatisfactory for fetal specimens of Aves, because of the large amount of fat and protein. The writer avoids this by introducing two preliminary steps: (1) The specimen is placed in equal parts of glycerin, 95% alcohol and distilled water, and 10% aqueous pepsin (with a drop of 6N HCl added) injected into the yolk sac, with 2–3 hours incubation at 40°C. (2) While in 5% aqueous KOH (with a few drops of 2% H_2O_2), the fat areas are injected with cellosolve; and the specimen is left in this solution until skeletal elements become clearly visible. Staining in alizarin red S then follows.

BECHTOL, C. O. (1948.) **Differential in toto staining of bone, cartilage and soft tissues.**—*Stain Tech.* **23.** 3–8. [Author's abst. copied *verbatim.*] **2603**

The following method for staining bone and cartilage allows study of the gross cleared specimen and does not injure the tissues for subsequent microscopic study: Fix in 10% neutral formalin; bleach thoroughly in 3% H_2O_2 in sunlight. Wash in distilled water. Stain bone 24 hours in 0·01 g. of Biebrich scarlet in 100 ml. of distilled water. Destain in 95% alcohol until soft tissues and cartilage are colorless. Stain cartilage 24 hours in a pH2 buffer solution of 2·1 g. of citric acid per 100 ml. of water with 0·001 g. of methylene blue. Destain in pH2 buffer solution until soft tissues are pale. Dehydrate in two changes of 95% alcohol in preparation for clearing. (This completes the destaining and may remove too much stain from the cartilage if destaining in the pH2 solution has been carried too far.) Place in Groat's clearing fluid and cover loosely so that the alcohol may evaporate, or remove the alcohol in vacuo. Groat's Mixture No. 19 is usually satisfactory.

For a combined stain, first stain bone, as above, and then apply the cartilage stain.

Seal jars with an ordinary liquid wood glue such as LePage's.

BUNTING, H. (1949.) **The histochemical detection of iron in tissues.**—*Stain Tech.* **24.** 109–115. [Author's abst. copied *verbatim.*] **2604**

The fixation and staining of iron in tissues is discussed. Procedures for demonstrating iron in hemoglobin and nuclei are also briefly considered.

Lillie's formalin buffered at neutrality gave the optimal fixation for iron. The Prussian blue method was preferred to the Turnbull blue. Lison's procedure of the former, slightly modified, gave the most satisfactory results. When a procedure is required that employs non-iron-containing reagents, Macallum's or Mallory's hematoxylin and Quincke's ammonium sulfide method are useful. The former, though not entirely specific, is preferable under controlled conditions when the quantities of iron are small. Hemoglobin iron in paraffin sections can be demonstrated by the usual procedures for iron after previous exposure of the section to peroxide, as recommended by Brown. The property of nuclei to adsorb iron from inorganic sources and from haemoglobin can readily be shown; caution is required in interpreting the iron detected in nuclei after Macallum's sulfuric acid hydrolysis.

ADAMSTONE, F. B., & TAYLOR, A. B. (1948.) **The rapid preparation of frozen tissue sections.**—*Stain Tech.* **23.** 109–115. [Authors' abst. copied *verbatim.*] **2605**

The essential feature of this procedure involves the rapid freezing of the tissue following excision and keeping it frozen until the desired chemical or fixative has been applied. For freezing, either carbon dioxide or liquid air is used, as desired. The microtome knife is thoroughly cooled by taping blocks of dry ice to its surface. The cut sections, still frozen, are manipulated by a camel's hair brush so that they lie flat upon the knife. They are then transferred to a slide by a special section lifter. This has the form of a double-bottomed scoop packed with dry ice. Thus the section remains frozen while it is transferred to a clean microscope slide held at an angle above a Coplin jar of the desired reagent. The sections must be immersed just prior to melting. They curl and do not adhere to the slide if still rigidly frozen, and are distorted if immersed after melting.

With this technic sections showing a minimum of cellular distortion may be obtained. Consequently, it facilitates the use of many cytological technics, chemical tests, and enzymatic studies, such as the Gomori technics, on a variety of tissues.

KURNICK, N. B., & HANS, R. (1948.) **A new stain mixture: aceto-orcein-fast-green.**—*Stain Tech.* **23.** 17–18. [Authors' abst. copied *verbatim.*] **2606**

A new mixture consisting of aceto-orcein, fast green, and salt is described. The mixture provides contrast between nuclear material, nucleoli and cytoplasm without differentiation. We have found it most useful in the staining of teased tissues, squashes, smears and suspensions (fixed and unfixed). We recommend it for the great speed and simplicity with which it provides a stain having the contrast of much more laborious histological technics.

MARKHAM, M. (1948.) **A buffered Giemsa-Bodian stain for neurological material.**—*Stain Tech.* **23.** 197–200. [Author's abst. copied *verbatim.*] **2607**

A buffered Giemsa counterstain for the Bodian method is described. It is very useful for bringing out Nissl substance and nerve fibers in the same section. Bouin perfused or formalin fixed material from mammals, amphibia, reptiles and fish was used. After fixation, all tissues were decalcified for at least a week in 50% formic acid (1 part) and 20% sodium citrate (1 part). This was washed out thoroughly. The method described by Bodian (1936) was followed except for the following minor changes: Winthrop Protargol (Strong Protein Silver) Batch N346BJ was used exclusively; all glassware was cleaned with acid prior to setting up the stain; before developing, the sections were washed in warm tap water for 10 minutes; the gold chloride was chilled before use. The sections were then put

into buffered Giemsa for 24 hours. Stock Giemsa: 0·75 grams powdered Giemsa (Coleman and Bell, Certification No. CGe-3) was dissolved in 50 ml. of glycerin overnight in the oven, then 50 ml. of methyl absolute alcohol were added. To 3 ml. of Giemsa stock solution, 87 ml. of distilled water buffered to pH 5·3 with 10 ml. of Sörensen's buffers were added and the solution filtered. Coleman buffer tablets gave best results at pH 5·0. Sections were then rinsed in 95% alcohol, two changes of absolute alcohol, two changes of xylene, and were then mounted in Clarite.

DUFFETT, R. E. (1949.) **Hematoxylin-neutral-red. A stain for cell inclusions and certain tissue elements.**—*Stain Tech.* **24.** 73–77. [Author's abst. copied *verbatim.*] **2608**

A method is described for the staining of paraffin sections using hematoxylin as a nuclear stain followed by neutral red. The neutral red is differentiated in aniline-xylene and some viral inclusions and certain cell tissue elements are brought into prominence by this differentiation and show a specific affinity for the dye.

KIMBALL, A. C., & KABLER, P. W. (1948.) **The effect of chlorine on complement fixation.**—*J. Lab. clin. Med.* **33.** 254–256. [Authors' conclusions copied *verbatim.*] **2609**

Attempts to titrate the reagents for the complement fixation test are unsuccessful when distilled water with a high chlorine residual (0·8 parts per million or higher) is used in preparing the saline solution. Complement fixation tests using water with lower chlorine residuals (0·6 parts per million or less) require more hemolysin or more complement or more of both than tests using chlorine-free water. Only chlorine-free water should be used in saline for complement fixation procedures.

HINSCHE, G. (1943.) Technik und Anwendungsgebiete der Intralumination-methode zur Beobachtung innerer Organe am lebenden Tier. **[Transillumination of internal organs during life.]**—*Z. wiss. Mikr.* **59.** 131–141. [Abst. in *Stain Tech.* **21.** 165. (1946), copied *verbatim.* Signed: J. M. THURINGER.] **2610**

The position, form, and function of internal organs may be observed in the living animal by means of x-rays, endoscopy, contrast media and fluorescence processes as well as with surgical methods. The author believes the non-operative technics pose advantages by preserving normal relations and conditions, their only disadvantage being the limited application, loss of color and plasticity, and other disturbances. The author recommends his method of "intralumination". He suggests the use of small pencil light bulbs mounted on suitably flexible leads. These can be used directly, or may be placed in glass tubes for insertion in the mouth, esophagus, stomach, etc. of amphibians and other animals. Observations are made in a darkened room. Among the advantages of this method are prolonged and continuous observation without injury to the animal, a better demonstration of dimensions, and observations of the lungs not demonstrable by any other method. Lastly, this method may also be used to visualize and circumscribe the operative field.

MAURO, A., TRUANT, A. P., & MCCAWLEY, E. L. (1948.) **Electrophysiological methodology for studies in neuropharmacology.**—*Yale J. Biol. Med.* **21.** 113–120. [Authors' summary copied *verbatim.*] **2611**

Principles of standard oscilloscopic design have been adapted for the observation of neural phenomena in pharmacological investigations. A versatile amplifier, with good stability and fidelity, is described. The oscilloscope, as used, provides absolute synchronization of the nerve action potential with the visual trace. The construction of a useful chamber for evaluation of local anesthetic activity on isolated nerves is also described.

MAURO, A., & BARRON, D. H. (1949.) **Instrumentation for laboratory exercises in basic electrophysiology.**—*Yale J. Biol. Med.* **21.** 305–311. [Authors' summary copied *verbatim.*] **2612**

Circuit designs are presented for the construction of an amplifier that can be used with an oscilloscope (Dumont or Heath Kit) by medical and graduate students in laboratory exercises in illustrating the electrical properties of the excitable tissues. An outline of a laboratory exercise that has proven a successful guide for students is also presented.

SONKIN, L. S., LIPTON, M. A., & VAN HOESEN, D. (1946.) **An apparatus for dispersing finely divided dusts.**—*J. indust. Hyg.* **28.** 273–275. [Abst. in *Bull. Hyg., Lond.* **22.** 198. (1947), copied *verbatim.* Signed: C. N. DAVIES.] **2613**

This apparatus is meant to disperse powders into air so that their ultimate particles become individually airborne as far as possible.

A steam of dry air is blown through a sintered glass disc on which a quantity of powder has been placed. The air carries particles upwards through a glass cylinder to a nozzle. Coaxial with the nozzle is a smaller air-jet which helps to break up aggregates. The whole system is vibrated.

The apparatus was tested by being blown continuously into a chamber for about two hours.

Samples taken with a cascade impactor showed the output to be quite constant as regards particle size and to fall off slowly in concentration. Air-borne clouds were attained, having particles a little coarser than those of the original powder.

The prospects of dispersing a powder more or less in its ultimate particles depend very much upon its nature and whether it has been specially prepared with this end in view. This side of the problem is not discussed in the paper.

ROSE, H. E., & LLOYD, H. B. (1946.) **On the measurement of the size characteristics of powders by photo-extinction methods. I. Theoretical considerations. II. The experimental investigation of the photo-extinction laws.**—*J. Soc. chem. Ind.* **65.** 52–58; 65–74. [Abst. in *Bull. Hyg., Lond.* **22.** 461. (1947), copied *verbatim*. Signed: C. N. DAVIES.] **2614**

This study of the photo-electric measurement of light extinction by a suspension of particles has a bearing on popular methods of estimating the specific surface and size distribution of air-borne dusts. The need for introducing an opacity factor, which depends on particle size, is brought out though the theoretical discussion of the method is questionable.

See also abst. **2429** (electron microscope).

MISCELLANEOUS

EBENEZER, G. (1948.) **An abnormal tooth in an elephant.**—*Indian Vet. J.* **25.** 165–166. **2615**

An abnormally protruding first molar tooth in the lower jaw of a female elephant was extracted after injection of 40 ml. of 3·75% stovaine [amylocaine hydrochloride] as a local anaesthetic. The operation is briefly described.—P. C. GANGULEE.

STEEVES, D. M., & VILLENEUVE, P. (1948.) **Dermatitis following prolonged contact with equine excretions.**—*Canad. J. Comp. Med.* **12.** 19–20. **2616**

The rectal examination of three thousand mares for diagnosis of pregnancy had to be commenced without long-sleeved rubber gloves. Within a week, symptoms of dermatitis were so severe that it was necessary to discontinue operations. Various lotions, zinc oxide ointment and vaseline were only of temporary, if any, value. When the gloves were obtained, the dermatitis rapidly subsided and did not return. Sensitivity of touch is reduced by gloves but, in a few days, this is so adjusted as to permit accurate work. Rubber sleeves, aprons and boots appear to be necessary when continuous work of this nature is undertaken.—RONALD GWATKIN.

OGG, W. G. (1947.) **Soils and health.**—*Advanc. Sci.* **4.** 265–272. **2617**

The relationship of soil composition to health in plants and in animals is discussed with special attention to the trace elements. The contention that artificial fertilizers poison the soil and are injurious to the health of plants, animals and man is critically examined and rejected.—M. C.

REPORTS

DEEN, M. M., & CHADA, S. R. (1947.) **Bombay, India. Annual Administration Report of the Civil Veterinary Department, Bombay Province, including the Bombay Veterinary College and the Bombay City and Harbour Veterinary Department for the year 1945-46.** pp. 52. Bombay: Govt. Central Press. 8vo. Annas 8 or 4d. **2618**

The Bombay Veterinary College was affiliated to the Bombay University for the four-year veterinary degree course (B.Sc.). There were 64 students on the college roll at the beginning of the year. Of these 17 passed the final examination. The Bai Sukarbai Dinshaw Petit Hospital for animals attached to the college was used for diagnostic and teaching purposes for students. Here 7,701 animals were treated and of these 4,049 were in-patients consisting of 911 equines, 1,543 bovines, 1,595 dogs and birds. Antirabic treatment was given to 82 animals. In the college laboratory 6,106 specimens were examined of which 2,888 were found to be positive. The details of examination and results are tabulated. Forty-nine P.M. examinations were carried out in the college pathological laboratory and histopathological examination on 79 specimens.

In addition to the rinderpest goat virus station in Bombay another temporary one was opened at Dhulia to meet the increasing demand. In all 581,780 doses of virus were produced and 572,740 doses were supplied to the field staff and the Indian states as against 903,890 doses produced and 721,750 doses supplied during the previous year. The total expenditure amounted to Rs. 49,104 as against Rs. 57,474 in the previous year. A 12-month course of training for stockmen was started and 54 ex-servicemen were admitted.

The staff of the Civil Veterinary Department including the college consisted of the Director, 2 class I, 14 class II, 4 miscellaneous, 164 sub-

ordinate service officers and 37 stockmen. There were 138 hospitals and dispensaries working, five of which were newly opened. In these 248,729 animals were treated and 41,438 castrations were performed. Besides, 105,164 animals were treated and 18,223 castrations done during tours in the villages. 4,361 outbreaks of contagious and infectious diseases were attended to, such as ANTHRAX (88), HAEMORRHAGIC SEPTICAEMIA (881), BLACKLEG (956), FOOT AND MOUTH DISEASE (1,144) RINDERPEST (775) and 517 from other diseases. The total mortality was 24,305 as against 31,372 in the previous year. The low mortality was partly due to less prevalence of RINDERPEST and to the immunization campaign against it in certain districts. Still, a large number of deaths (8,799) were due to RINDERPEST. In poultry, FOWL CHOLERA (*Pasteurella* infection), RANIKHET (NEWCASTLE) DISEASE and FOWL POX were prevalent and deaths due to NEWCASTLE DISEASE were 1,290.

1,650 animals were protected against ANTHRAX with serum and 1,929 with spore vaccine. 139,970 animals were protected against HAEMORRHAGIC SEPTICAEMIA with either vaccine or serum with a mortality of 0·002%. 126,743 animals were protected against BLACKLEG with a mortality of 0·001%. 223,674 animals were protected against RINDERPEST in villages during the year either by serum alone, sero-vaccine or goat virus alone, with a mortality of 0·009%. In suburban districts and in the city of Bombay 14,663 and 25,281 milch buffaloes respectively were protected against RINDERPEST. 862 sheep were vaccinated against SHEEP POX. 1,010 fowls were protected against FOWL POX and 259 against FOWL CHOLERA. The details of mortality, preventive inoculations, etc., are tabulated.

Under the Glanders and Farcy Act 25 cases of GLANDERS and 48 of SURRA were suspected and examined. Of these 17 (11 clinical and 6 non-clinical) were found positive for GLANDERS and destroyed. The six non-clinical cases destroyed were compensated. Of these 48 cases of SURRA 36 were treated with antrypol and returned to the owners.

During the year 180 horses were imported into Bombay from various ports. 1,407 Indian breed horses were brought from up country by rail and road, mostly for Bombay markets. 186 horses were tested with mallein and all gave negative reactions.

The scheme for TICK control originally subsidized by the I.C.A.R. was continued by the local Government and extended up to March, 1949, as the work had yielded good results. Under the scheme five cattle dipping tanks and two spraying machines were maintained in various parts of the province. In all 15,610 animals were dipped and 2,366 animals sprayed. In one tank home-made dip was used and in the rest Cooper's cattle dip. The tick infestation was said to have been reduced by 80% in some localities and the public were taking keen interest and bringing their animals for dipping.

131,750 cattle and 47,649 buffaloes were inspected for slaughter by the departmental staff in the various slaughter houses and 8,196 cattle and 1,969 buffaloes were rejected as coming within the banned categories.

The total expenditure of the department was Rs. 1,165,155, of which Rs. 925,634 was met from the provincial revenues and Rs. 239,520 by local bodies. The Government of India contributed Rs. 14,749 in connexion with the administration of the Livestock Importation Act and the I.C.A.R. Rs. 12,039 towards research schemes.—M. K. S.

GRIFFIN, C. A., & DEAN, D. J. (1945.) **Animals. Laboratory farm.**—*Ann. Rep. Div. Lab. Res. N.Y. St. Dept. Hlth.* pp. 29–34. **2619**

Horses, rabbits, g. pigs, hamsters, ferrets, rats, mice, goats and poultry are maintained in order to provide the Central and Branch Laboratories with experimental animals. Corriedale and Suffolk sheep are kept to provide erythrocytes for serological tests.

An EYE INFECTION, manifest by an ophthalmitis and periorbital abscesses, although confined almost exclusively to young mice has been enzootic in two principal breeding colonies. A non-motile Gram-negative organism can be recovered regularly.

In the rabbit colony HEPATIC COCCIDIOSIS was the cause of losses especially in the young growing rabbits. Repeated nose cultures are made before new rabbits pass to the colonies in order to pick out carriers of *Past. lepisepticum* and *Br. bronchisepticum.*

SARCOSPORIDIA INFECTION has occurred in mice causing hypertrophy of the muscles of the shoulder and hind quarters. The only evidence of illness is a loss of hair, roughening of the coat and a scaly, unthrifty condition of the skin. P.M., the only lesions were in the muscles where longitudinal bands of pale degenerative tissue were found on histological section to have a massive infection with *Sarcosporidia.*

DIARRHOEA of non-bacterial aetiology occurred in 1–10% of the young mice of pre-weaning age. It was found by changes and substitutions in the feed that there was a correlation between the incidence of the diarrhoea and certain types of food. The addition of 1% brewers' yeast to the diet appeared to be beneficial.

The ferret colony sustained losses due to the destruction of young by the mothers and to alleviate this condition particular attention was

given to diet and to various types of nesting arrangements.

A pure bred Sanaan goat which had a negative agglutination titre to *Br. abortus* developed ORCHITIS and ARTHRITIS in the stifles, hocks and pastern joints. Both testes were indurated and atrophied and on histological examination following autopsy showed generalized fibrosis with marked calcification and multiple areas of from 3 mm. to 2 cm. of focal necrosis containing dark brown exudate. Examination of material from epididymal and joint lesions revealed no significant organism.

Amyloidosis was often demonstrated P.M. in horses used in the production of various antibacterial sera.—F. R. BELL.

GRIFFIN, C. A., & DEAN, D. J. (1946.) **Animals. Laboratory farm [breeding and diseases of].**—*Ann. Rep. Div. Lab. Res. N.Y. St. Dept. Hlth.* pp. 48–51. **2620**

92,890 mice, 13,416 g. pigs, 1,935 hamsters, 1,260 rabbits, 96 white rats and 16 ferrets were produced in the breeding colonies and distributed to the Central or Branch Laboratories.

Sheep are bled once a week and the red cells are transmitted by parcel post to the branch laboratories. The flock of sheep has been enlarged by breeding from 101 to 152 and investigations are being carried out to ascertain any genetic factors which may influence the suitability of the erythrocytes for serum diagnosis procedures.

P.M. examinations of g. pigs and hamsters revealed no evidence of bacterial diseases. RESPIRATORY INFECTIONS caused by *Pasteurella lepisepticum* and HEPATIC COCCIDIOSIS occurred in the rabbit colonies. A single case of PULMONARY ASPERGILLOSIS occurred in a young rabbit.

Of all young mice examined P.M., 18% have been killed because of an OPHTHALMIA frequently associated with periorbital abscesses. Cultures on blood agar plates revealed a moderate to heavy growth of small to medium, elevated, tannish-grey colonies. The Gram-negative rod is non-motile, stains poorly, but grows well on blood-enriched medium; glucose and maltose are fermented, but not lactose, mannite, inulin or gelatin. The organism bears a closer resemblance to *Past. septica* than to any other species. Studies of pathogenicity and attempts to reproduce the disease are being made.

Losses among breeding mice were almost entirely confined to animals destroyed because of TUMOURS. Approximately 2% of all mice examined P.M. had patchy or generalized loss of hair; this condition cannot be accounted for.

DIARRHOEA among young mice of preweaning age occurs in a small percentage. The cause of this condition is unknown although the nature of the mother's diet is suspected as a possible cause. Cod-liver oil and dried brewers' yeast is added to the diet as a supplement.

—F. R. BELL.

BOOK REVIEW

DÉVÉ, F. (1949.) L'échinococcose primitive. (Maladie hydatique). **[Echinococcosis.]** pp. 362. Paris: Masson et Cie. Fr. 1,000. **2621**

This work is divided into two parts: Part one, which runs to 236 pages contains an historical review of echinococcosis in general. There is a detailed account of the parasitology of the tapeworm and an account of the pathological and anatomical changes brought about by the primary hydatid cyst.

In the second part the role of the various animal hosts is briefly described. Details of the recorded geographical distribution are given and the general prophylactic measures are reviewed. There is a comprehensive bibliography.

—D. LUKE.

BOOKS RECENTLY RECEIVED

Notice of recently received books in this list does not preclude review.

CLARK, H. T., *et al.* **A symposium on the use of isotopes in biology and medicine.** pp. xiv + 445. Madison: University of Wisconsin Press. (Reprinted.)

KUST, D., & SCHAETZ, F. (1949.) Fortpflanzungestörungen der Haustiere. **[Reproductive disorders in domestic animals.]** pp. ix + 207. Stuttgart: Ferdinand Enke. DM. 15.

ROLLE, M. (1949.) Mikrobiologie und allgemeine Seuchenlehre. **[Microbiology and epidemics.]** pp. xvi + 439. Stuttgart: Ferdinand Enke. DM. 22.70.

TOBIAS, N. (1948.) **Essentials of dermatology.** pp. xvi + 518. London: J. B. Lippincott Co. 3rd Edit.

WOLFF, E. (1946.) Les changements de sexe. **[Sex reversal.]** pp. 306. Paris: Librairie Gallimard. Fr. 205.

WOLFF, E. (1948.) La science des monstres. **[Teratology.]** pp. 265. Paris: Librairie Gallimard. Fr. 580.

5985—Wt.P3—Dd294—1/50—H.R.G., Ltd.—G.13.

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